Rock Products

THE INDUSTRY'S RECOGNIZED AUTHORITY

JUNE · 1959

Stream pollution—how does it effect you? page 76

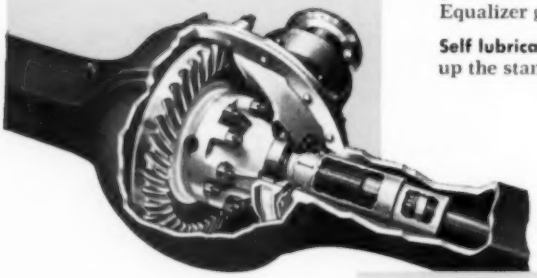
Gravel pits are getting new faces

page 106

NEW ROCKWELL TRACTION EQUALIZER...

puts the action where there's traction!

Available with Timken-Detroit® Axles for safer, surer performance... on or off the highway!



Applies driving force to wheels with best traction. The Rockwell Traction Equalizer provides a substantial increase in tractive effort to the wheel with the best road adhesion. It is effective on a vehicle even if one pair of the driving wheels has *no* traction!

Safer, surer operation. A truck equipped with the Rockwell Traction Equalizer is easier to control on curves, slippery pavement and soft ground. The tendency of a vehicle to swerve when one wheel suddenly loses traction is eliminated because wheel spinning is reduced.

Constant actuation. The Rockwell Traction Equalizer doesn't depend on the driver to start it working. It is effective whenever one wheel has the tendency to turn faster than the other.

Tailored for effectiveness. With multi-drive axle vehicles, each axle may be equipped with Traction Equalizer units. No matter where your vehicles operate—on or off the highway—the Rockwell Traction Equalizer gives your vehicles better traction.

Self lubricating. The Rockwell Traction Equalizer automatically picks up the standard axle lubricant and works it through the unit.

Less maintenance. The Rockwell Traction Equalizer normally requires no maintenance between axle overhaul periods. It also cushions heavy impact loads upon tires, shafts and gears.

Another Product of...

ROCKWELL-STANDARD CORPORATION

ROCKWELL R STANDARD®

Transmission and Axle Division, Detroit 32, Michigan

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B.F.Goodrich

Photo by U.S. Bureau of Reclamation

Rubber builds a rock pile to hold back a river

B. F. Goodrich improvements in rubber brought extra savings

Problem: Millions of tons of gravel and clay will be carried two miles down that mountainside to build one of the world's largest earth-fill dams. Because of the heavy loads, only short lengths of ordinary conveyor belts could be used. But every extra transfer point where one belt dumps onto another adds to costs. They needed a belt strong enough to carry this "fill" from mountain top to the dam in just a few long hops.

What was done: Engineers recommended that the gravel and clay be carried by a series of only nine B.F. Goodrich Nyfil conveyor belts—one of them nearly a mile long. In this belt, nylon is used as cross threads in the fabric to give extra flexibility and decrease weight. Belts made with Nyfil fabrics have greater impact resistance, can carry heavier loads farther than belts made with ordinary fabrics. Yet these stronger, longer-lasting belts cost no more.

Savings: On this construction job, the number of transfer points was reduced almost to half by using B.F.Goodrich Nyfil belts. This means big cuts in construction, operation and maintenance costs. Almost 3000 tons per hour are carried by the nine B.F.Goodrich belts.

Where to buy: Your B.F.Goodrich distributor has full information on the conveyor belts described here. And, as a factory-trained specialist in rubber products, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Department M-602, Akron 18, Ohio.*

B.F.Goodrich *industrial rubber products*

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Rock Products

Vol. 62, No. 6

JUNE 1959

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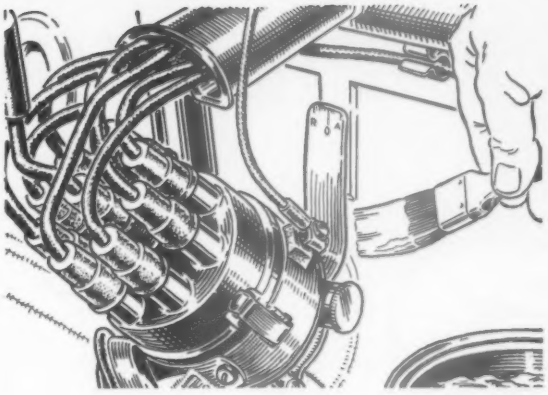
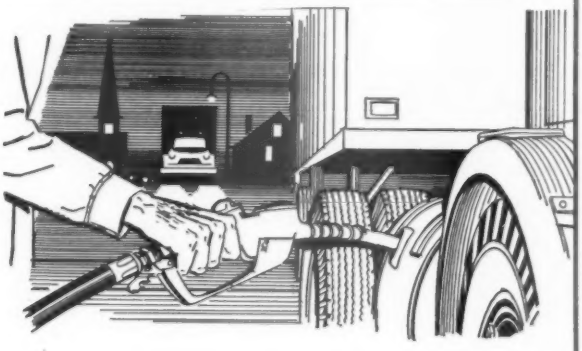
LUBE LOGIC

These sure-money "SLEEPERS" can stop the clock on maintenance time



WATERPROOFED IGNITION MAKES STARTING EASIER

Are your batteries showing the strain of a heavy foot on the starter on damp days? Get your TAE* to show you how to waterproof ignitions with Texaco Rust-proof L. It's a simple, five minute job that pays off with months of faster starts.



HOW TO KEEP CONDENSATION OUT OF YOUR TANK

Condensation in your fuel tank can make even the best gasoline sound like you were robbed. One way to avoid it is to fill your tank in the evening—when it's cool and the gas has contracted to minimum volume—and *keep* it filled overnight. This cuts down the possibility of condensation by reducing air volume.

TRUCK RECORD FOLDER

Sturdy manila folders designed to help you keep tabs on mileage, oil changes, lubrication, tire life, batteries, etc., is yours for the asking. Tell your TAE* how many you need: or write direct.

*TEXACO AUTOMOTIVE ENGINEERS

Every month or so we'll bring you a batch of "sleepers"—little angles, so easy to overlook, where big savings in time and money can be made. But month in, month out, your local Texaco Automotive Engineer is the best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control." Texaco Inc., 135 East 42nd St., New York 17, N. Y. Dept. RP-10.

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ANOTHER NEW SLIDE RULE

VIBRATING SCREEN CAPACITY CALCULATOR
TELSMITH
INSTRUCTIONS (See note 1 on reverse side.)
1. Set size of clear screen opening (scale A) at material.
2. Set per cent of feed less than ½ size of opening (scale C) at per cent of oversize in feed (scale B).
3. Read tons per hour, per square foot, thru screen (scale D) at arrow E. (BLACK FIGURES)
4. Read tons per hour passing thru screen (scale D) at size of screen. (RED FIGURES)
5.
SMITH ENGINEERING WORKS
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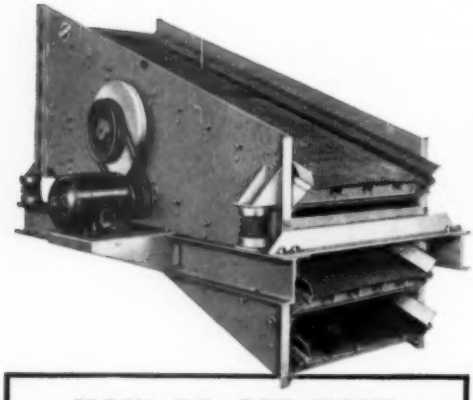
FREE!

gives you VIBRATING SCREEN CAPACITIES



Another Telsmith first—a handy, compact slide rule with all the factors needed to determine the capacity of any vibrating screen. It takes into consideration—(1) the kind of material to be screened; (2) size of screen openings; (3) percentage of oversize in the feed; (4) percentage of feed less than one-half size of screen openings; (5) whether top, second, or third deck; (6) shape of screen openings; and (7) screen slope. This slide rule gives you, in a few seconds, tons per hour per square foot through screen cloth and capacity of any size of screen. It will help you to pick and buy the most economical size of vibrating screens for your plant or mill.

HOW TO GET YOUR FREE SLIDE RULE

A request for a **Vibrating Screen** Slide Rule addressed to Smith Engineering Works, Milwaukee 1, Wis., on your letterhead, stating your position, will bring you one with Telsmith's compliments.

SRV-559

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26 NORTHWESTS for Concrete Materials & Construction Co. Cedar Rapids, Iowa

THE endorsement of a product by constant year after year usage and repurchase is the most dependable assurance of profitable performance you can have.

Concrete Materials & Construction Co., of Cedar Rapids, Iowa and Eskridge, Kans., conduct one of the largest quarry operations in the country. The twenty-six Northwests they have purchased since 1942 averages over 1½ machines a year. This type of endorsement of machines in hard rock work is far more emphatic than anything that could be said or written.

Concrete Materials & Construction Co. is one of the many that make an average of every 3rd Northwest a repeat order. There are new improvements to know about. You'll be interested. Let a Northwest man bring you up to date.

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S-60-77-S

A Northwest 80-D Rock Shovel loads stone to a Cedarapids Crushing plant at Eskridge, Kansas.

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3 I-R Drillmasters REPLACE 17 OTHER DRILLS in large quarry operation

In a four-million-ton per year quarry, operated by Solvay Process Division, Allied Chemical Corporation, three Ingersoll-Rand Drillmasters are now doing the same amount of work that previously required eleven churn drills and six wagon drills!

Based on the performance of the first Drillmaster, which drilled about 100,000 ft. in the first year of operation, it was apparent that major savings could be made by this advanced drilling method using the revolutionary I-R DOWN-HOLE drill. Two more machines were purchased and the 17 other drills were put on the retirement list. The saving in direct labor was equally impressive, releasing needed manpower for other operations.

For maximum production at lowest overall cost, join the swing to the Drillmaster method. Your Ingersoll-Rand representative will be glad to tell you all about it. Call him today.

Ingersoll-Rand

5-942 11 Broadway, New York 4, N.Y.

A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR ROCK DRILLING

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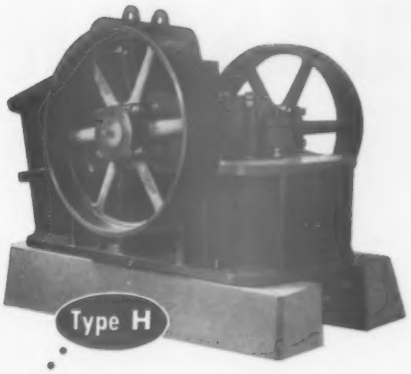
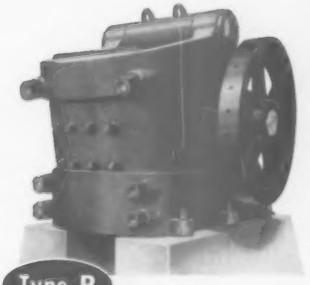
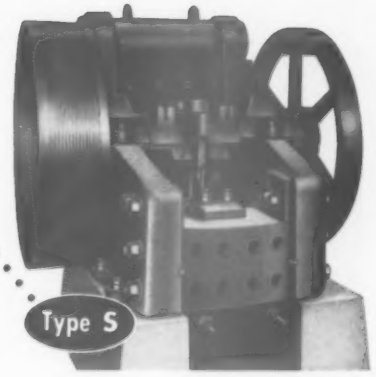
Many operators throughout the world know the economy and rugged dependability of Traylor-Made Jaw Crushers. Over 50 years of experience results in many advantages for the user of these crushers.

Traylor-made Jaw Crushers

Some of the features incorporated in Traylor Jaw Crushers are jaw plates of the Traylor curved type—the pitman shaft is made of annealed open hearth forged steel. The swing jaw is made of cast steel of extra heavy design for maximum strength. For more of the features of Traylor Jaw Crushers, write to Traylor today.







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THE SIZE, THE POWER AND

5 ½" hammer diameter—Here's deep hole drilling power that packs plenty of punch. Gardner-Denver DH143 fills the rock drill gap between wagon drill and rotary rig.

Tough and long-lasting—Gardner-Denver drill steel. Emergence from heat-treat furnace shows carburizing process that results in abrasive-resistant exterior and tough inner core.

First choice in crawler drills—The versatile swing-boom "Air Trac"®. Now available in a variety of models including stiff- and swing-boom units with complete hydraulic components.

FOR ANY ROCK BLAST

THE SPEED YOU NEED

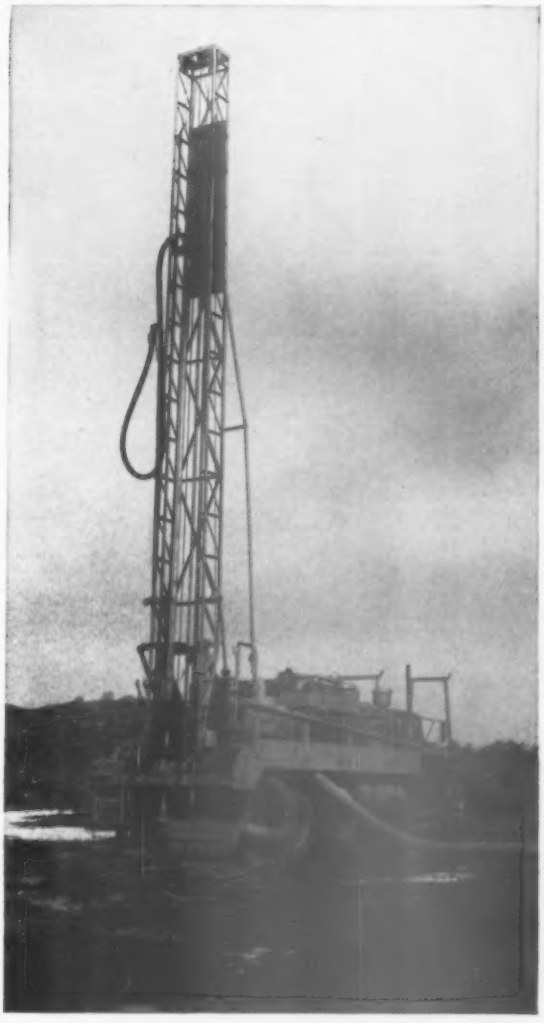
Select your rock drills from the most complete line of drifters in the field . . . GARDNER-DENVER

Gardner-Denver offers the most complete range of drifter drills known, thus assuring the right drill for your application, regardless of what it may be.

Talk to a Gardner-Denver blast hole specialist before you buy new rock drills. His experience can help you select the best blast hole plan and the right equipment for the job from Gardner-Denver's complete line of drills, rigs, steel and accessories.

MIDNIGHT MISSION

When unexpected developments demand immediate attention (additional equipment, essential parts, special service), a Gardner-Denver man is ready to go—any time, anywhere. And at Gardner-Denver, there's no substitute for men—our 100-year philosophy of growth.



In-the-hole power for rotary rigs—New Gardner-Denver "Mole-Dril"* rides with the bit through rock . . . delivers more striking power than any other drill of its size.

GARDNER-DENVER Since 1859 100 1959 YEARS

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Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

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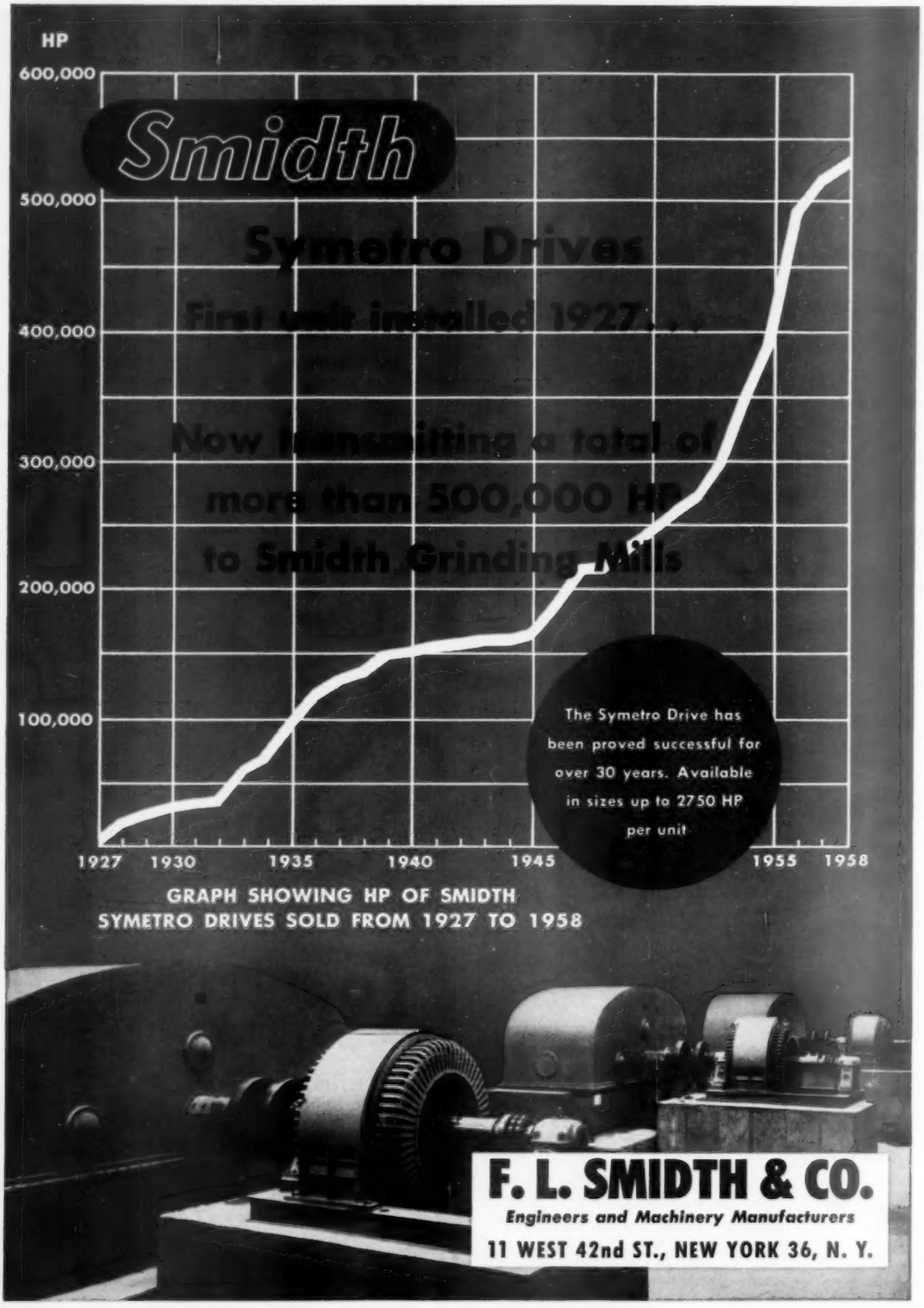
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Symetro Drives
First unit installed 1927...
Now transmitting a total of
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to Smidth Grinding Mills
The Symetro Drive has been proved successful for over 30 years. Available in sizes up to 2750 HP per unit
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11 WEST 42nd ST., NEW YORK 36, N. Y.

What's Happening

IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

June, 1959

Bacteria may be an integral part of chemical and manufacturing plants of the future. Research has discovered that bacterial reactions are often the least expensive way to accomplish some reactions—sometimes the only practical way. Texaco Oil Company's new refinery at Anacortes, Wash., cleans up refinery waste water by inoculating it with bacteria. They thrive on the phenols, sulfides, mercaptans and traces of oil in the effluent and neutralize the slightly alkaline water. Bacteria show great promise as insecticides, fumigants and as scavengers to reclaim minute amounts of metal from the tailings of smelters. Techniques for mutating and cultivating new strains of bacteria are expected to broaden the opportunity for new applications.

Cost-cutting on railroads gets more ingenious. Three big railroads are now exchanging accounting data which are recorded on electronic tapes. The Illinois Central, Southern Pacific and Southern are expediting their interchange of freight by recording information on magnetic tape and expediting the flow of information by passing the tapes around their accounting departments.

Electricity can now be generated directly from heat without the use of conventional steam boilers and turbines. A model of a new high-vacuum thermionic converter weighing less than half an ounce has generated an ampere at half a volt. While the new source of electrical energy is no threat to conventional methods, it has great possibilities where compactness and simplicity are more important than cost. The thermal efficiency is far greater than that of the well-known thermocouple, but the new converter has only a fraction of the efficiency of turbogenerators. But researchers at General Electric are making rapid strides to improve efficiency as well as power output. Meanwhile, Allis-Chalmers researchers are busy working over old but undeveloped ways of producing electric power. They have developed a laboratory scale "fuel cell" which converts hydrogen and oxygen gases into direct current using a catalyst. As one of the very few really successful fuel cells to be developed, it will have great potential value. But before a pilot model can be made, there are a number of problems to be resolved.

Diesel fuel exhaust will smell like roses if an experimental additive is successful. Busses in Cleveland's rapid transit system will use a mixture of the additive and a masking agent in the fuel oil in an effort to reduce fumes and odors in the exhaust. Other cities have tried to achieve the same results by injecting chemicals into the bus engine's exhaust system.

The decay energy of radioisotopes can now be converted into electricity. One of the first thermoelectric units to be successful is a lead telluride thermocouple which can convert the radiation of polonium-210 into three watts of electricity. The efficiency is low, about 8 to 10 percent, but it has some outstanding advantages. Efficiency of the unit apparently increases with decrease in temperature, and weight is only a few pounds—important advantages for space travel.

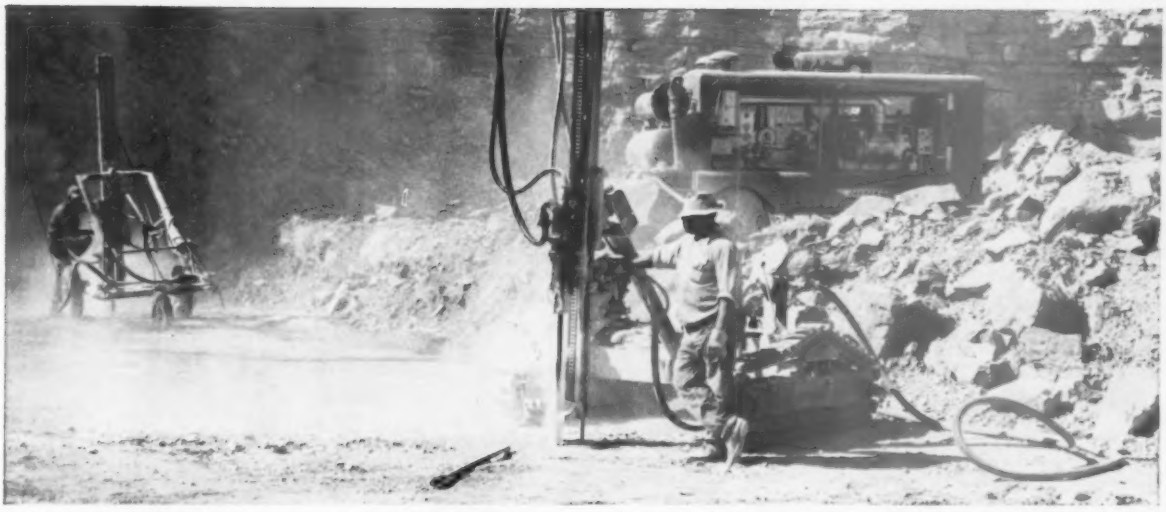
Heat tape to cure concrete is a Canadian development. The Financial Post reports that concrete can be cured in half the time, and permits curing in frozen ground and severe winter weather. Heat-conducting cords are sealed between sheets of plastic or bitumen-treated paper which is then used to line the bottom of a slab or footing or to line the forms. Each sheet is plugged into an electrical outlet after the pour and the concrete cures from the bottom up.

A jet-propelled catapult can throw a 20-ton plane into the air within 800 ft. The unit is powered with six jet engines developing 50,000 hp. It is compact enough to be moved into position with helicopters, trucks or transport planes. When used as an arresting gear, the device can "catch" a 15-ton plane traveling 150 knots and bring it to a stop in 30 seconds. The catapult was designed for the Marine Corps to launch or to land jet or propeller-driven aircraft by field forces away from conventional airstrips.

Radical new developments in powder metallurgy have brought a major breakthrough in processing tungsten, molybdenum and other refractory metals. Finely powdered, these metals are formed into blocks in 9,000-ton presses. A sintering process solidifies these blocks into workable billets weighing up to 500 lb. Fansteel Metallurgical Corp. of North Chicago has announced that it has developed new methods for extruding, spinning and deep drawing tungsten and other extremely hard metals which have been considered unworkable by conventional techniques.

Steel and plastic are now bonded together to form sheets which may find wide use in furniture, appliances and many other products. Colored vinyl plastic is joined permanently to cold-rolled or galvanized steel in a continuous process developed by United States Steel Corp. The vinyl-steel sheets can be formed, bent and fabricated without damaging the vinyl surface which itself is tough, abrasion resistant and inert to many chemicals. Products made from the newly developed material will find applications where either steel or plastic would be unsuitable if used alone, and can replace porcelain, aluminum, stainless steel or solid plastics.

The editors



11″ PER MINUTE PER DRILL, IN LIMESTONE LEDGE: Constant full pressure produces maximum footage with this Thor self-propelled "Rocket" rig and BW-2 wagon drill. "Our Jaeger '600' rpm's less, and its 100 psi easily operates the two drills without lag," says owner.

UP TO 140 LICKS A MINUTE with Jaeger "600" behind a McKiernan-Terry 9B-3 four-ton double acting hammer. The operation is setting piles and steel for cofferdams on reinforced concrete bridge project.

ON PIPE TUNNELING WORK, auger deflection caused by fluctuating air pressure formerly necessitated 2 to 3 drillings per hole. With the constant pressure of a Jaeger rotary, one drilling is now enough.

"Our air costs less than ever with a Jaeger"

Owners of Jaeger rotary compressors uniformly note their lower cost of operation compared with other makes. In 8 hours' steady operation a Jaeger "600", for example, averages 48,000 fewer revolutions than any of five other compressors which use the same GM 6-71 diesel engine (1700 rpm full load speed compared with 1800 rpm). Output exceeds 500 cu. ft. of air per pound of diesel fuel.

SLOWER SPEED MEANS SAVINGS

Jaeger 85, 125, 250 and 365 cfm models are similarly efficient. The fuel savings are substantial. Because all operation is below the continuous horsepower curve, engine maintenance is at a minimum. In the compressor unit, 8000 hours without replacing a single vane is not at all unusual.

Enjoy this low cost, trouble-free operation on your own work. We will be glad to provide full details and demonstration, or send latest Catalog.

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603 Dublin Avenue, Columbus 16, Ohio

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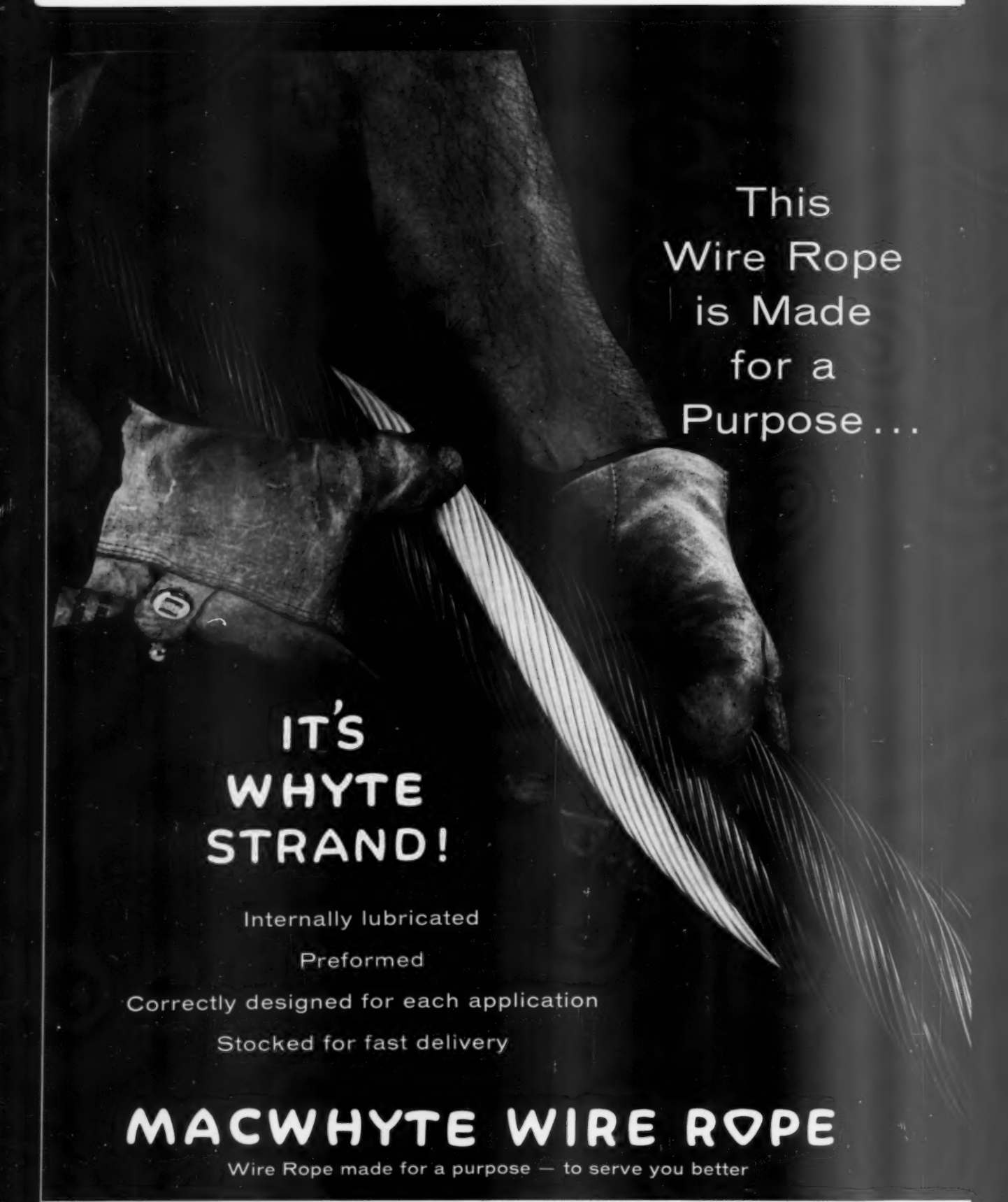

For cableway excavator rope, shovel and dragline rope, haulage rope, derrick rope, scraper and dozer rope.

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Distributed and stocked throughout the United States

EDITOR'S PAGE

George C. Lindsay, Editor

The maintenance man gets a promotion

WITHIN 10 YEARS, YOUR MAINTENANCE CHIEF WILL OCCUPY A POSITION of greatly elevated importance in your company. You'll be depending more and more on his ability to save and to make you money. He even may become your most important operating man in the future.

Look back a short 10 years ago, and you'll recognize right away the big progress in technology that has taken place. But we warn you that the progress made during that period will be small by comparison with the progress that will be made in the next 10 years.

The rock products industries are using mechanization to a high degree today. But it isn't enough. The logical extension of technology is moving us fast, in this jet age, into the field of instrumentation and automation. We really have to run, these days, to stand still.

While we're running, we must take a quick look over our shoulders at the myriads of rapidly developing process control methods that we pass along the way. There's a paradox here. If we don't slow down and select a few for application to our own business, we'll have to stop running. When we do that, we're through; we're out of business.

The new process control methods are based primarily on instrumentation in the broad sense. Experts tell us that instrumentation embraces four fundamental concepts: (1) measurement, (2) data handling and computation, (3) control and (4) systems engineering. Put them together properly, and you can make machines produce a predetermined product in the quality and quantity desired at a competitive cost. The machines will do the thinking for you. So you won't have anything to worry about, except . . .

How are you going to keep the complex instruments and controls at work constantly and accurately? That's where the maintenance chief steps in. He'll practically control your production, your product, your profit . . . even your ulcers.

There's no time to waste. We feel sure that your companies and your industries are moving fast toward this type of complex, fully controlled operation. You'll gain by getting all the information you can get on all the concepts of instrumentation. Apply these methods to keep up with the trend in improved production quality and efficiency.

Begin now to recognize the important place your maintenance man will have in your future scheme of things. The quicker you begin to train him in the principles of operation of these fully instrumented, automated processes and equipment, the better off you'll both be.

Enter 1209 on Reader Card

ROCKY'S NOTES

NATHAN C. ROCKWOOD

A Foundation for Prize Papers on Lime?

A LONGTIME FRIEND, whose name is intimately associated with the lime industry throughout the world, recently confided to this writer his ambition to establish a fund or foundation, from the proceeds of which a prize could be awarded annually for the most interesting and helpful paper, book or magazine article on the subject of lime. He did not specify, and possibly does not expect it, but in our humble opinion such a fund would necessarily be called "The Victor J. Azbe Foundation," for it is he who has the project in mind, and would contribute the wherewithal.

There have always been at least two ways of getting such a fund or foundation established: (1) The individual concerned does it within his own lifetime, or (2) it is done by his family or friends after his demise. When it is done by the man himself, there are always critics or cynics who are ready to accuse him of delusions of grandeur or self-aggrandizement. Of course, there is no doubt that a man who has achieved notable success in his profession or business likes to contemplate that in some manner his reputation may be preserved, for a generation or two, at least. But there are more noble purposes, and in this particular case we know there are.

You see, this writer has a very special interest in Victor Azbe's career in the lime industry. We can modestly but truthfully say that ROCK PRODUCTS, during the writer's editorship, had considerable to do with discovering his talents as a lime-plant engineer, and considerably more to do with making the lime industry, the world over, acquainted with those talents and ability. Today, he has clients in most of the countries over the world where lime is made and, we can safely say, is known by reputation in the few lands where he has not yet been consulted.

Like most of the rest of his contemporaries (some have already achieved it) Vic Azbe is near his biblical "three score years and ten." Hence, he is at an age where he can view things philosophically. There is, and truthfully can be, no one to carry on his special experience and reputation when he leaves off. Of course, what he has on hand, when the time comes, will be completed as he intended it to be. That would happen with any well-organized engineering firm; but a man's reputation is based not only on the work he has done, but upon his character and way he carried on. We doubt, in that sense, that our friend Azbe will soon, if ever, have a real successor.

The prime reason Vic Azbe wants to establish such a foundation is to encourage young men to strive for special knowledge about lime, and to encourage them to tell the world about it. He believes quite logically that doing this accounts for his life's work; and that his work and travel, acquaintances, friends and experiences which followed, directly and indirectly, have been the source of his greatest happiness in life. Certainly few men in any walk of life have had more opportunity to see the world and know intimately people in many countries than has our friend Azbe; and few, if any, could have derived more pleasure from it.

To appreciate his approach to such an enjoyable, interesting and useful life, we must tell you a little something about it. Vic Azbe was an orphan boy at 15, on his own in every way, and in a part of the world not celebrated at that time for any very advanced stage of civilization or enlightenment—the Province of Carniola in what is now Yugoslavia but was then a province in the Austro-Hungarian Empire in the southwest corner bordering Italy and Austria. The capital of the province is Ljubljana, which was Azbe's point of departure "to explore and conquer" the world outside.

Without funds or passport he was not welcome in any of the Mediterranean countries he started out to explore. He finally found his way by devious methods to a Turkish province where he got a job on railroad construction. This brought him into contact with the first mechanical devices he had ever had an opportunity to examine close at hand —and he was fascinated, especially with the operation of a dinky locomotive. Thus, at an age when most American boys are about finishing grade

Please turn to page 128

A big machine for a big job

Manitowoc dragline brings down 50 foot face of gravel . . . then re-handles the material by dredging 45 to 50 feet below water to supply Standard Slag Company washing plant.

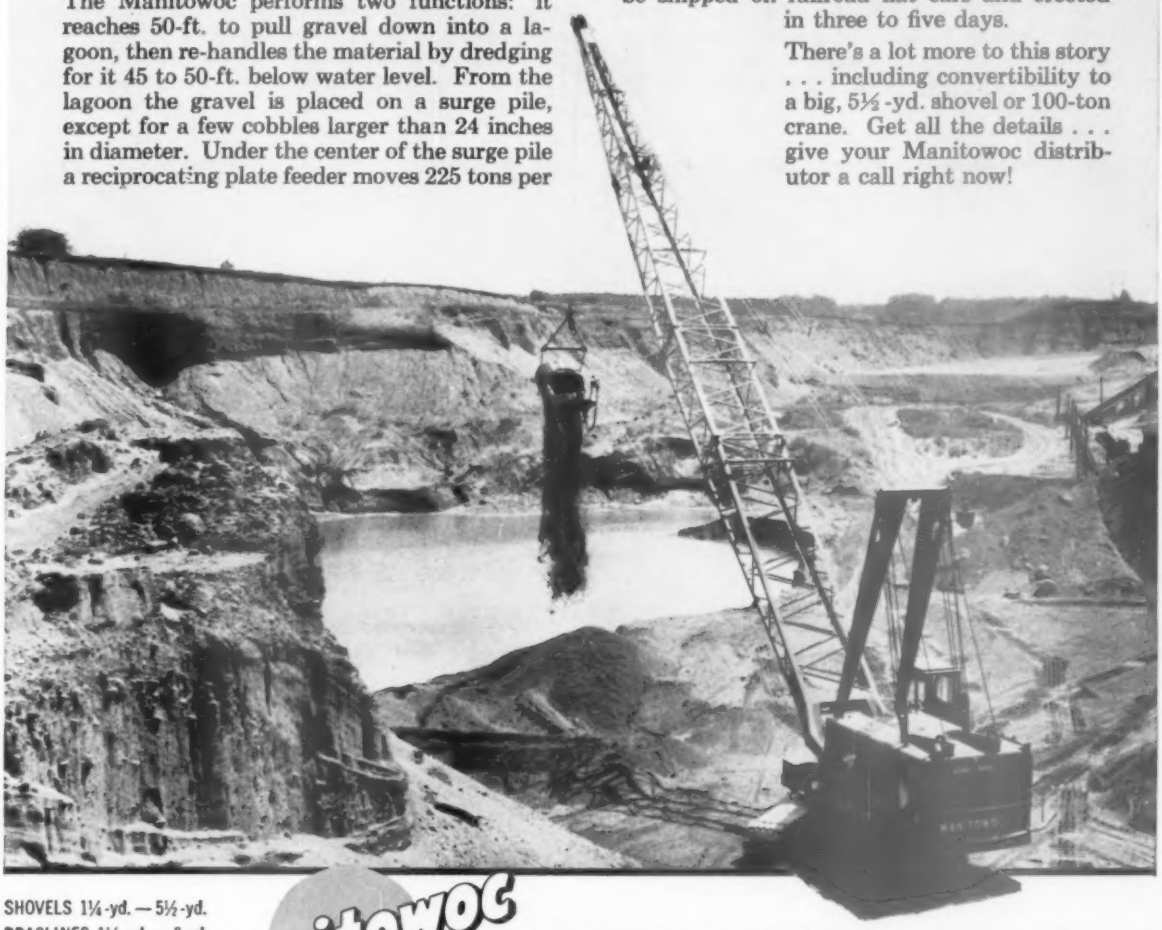
The Standard Slag Company's Crystal Springs washing plant near Massilon, Ohio runs through 225 tons of gravel an hour to operate at top capacity. A Manitowoc Model 4500 dragline with a 5-yd. bucket is used as the primary producer of gravel for the plant. The drag is diesel-powered and is equipped with a 140-ft. boom, providing the great reach needed on this tough job.

The Manitowoc performs two functions: it reaches 50-ft. to pull gravel down into a lagoon, then re-handles the material by dredging for it 45 to 50-ft. below water level. From the lagoon the gravel is placed on a surge pile, except for a few cobbles larger than 24 inches in diameter. Under the center of the surge pile a reciprocating plate feeder moves 225 tons per hour of gravel to an 1,800-ft. conveyor system leading to the processing plant.

The Manitowoc Model 4500 dragline is ideally suited to big scale operations of this sort because it combines unusual stability and long reach with a fast cycle and direct power flow. Modern, balanced design has produced a dragline with a big capacity, yet with the mobility of a two or three-yard rig.

And note that the Model 4500 has no clumsy electric cable trailing behind . . . no expensive, troublesome power installations to maintain. Low cost, easily-understood diesel-power lets you move quickly from one job location to another without the problem of available power. Moving long distances is just as simple, because this modern Manitowoc can be shipped on railroad flat cars and erected in three to five days.

There's a lot more to this story . . . including convertibility to a big, 5½-yd. shovel or 100-ton crane. Get all the details . . . give your Manitowoc distributor a call right now!



SHOVELS 1¼-yd. — 5½-yd.
DRAGLINES 1¼-yd. — 6-yd.

Manitowoc

MANITOWOC ENGINEERING CORP.
(A subsidiary of The Manitowoc Company, Inc.)
MANITOWOC, WIS.

Enter 1211 on Reader Card

In the ½ to 3-yd . . . 8 to 75-ton range, Link-Belt Speeder offers the most complete line of crawler and rubber-tired shovel-cranes . . .

31

Here's an opportunity to get exactly the machine you need . . . capitalize on scores of advance design features such as—

● **HIGH-SPEED, NON-FATIGUING CONTROLS:** Productivity can go up as much as 25% due to the control system alone. And only Link-Belt Speeder offers Speed-o-Matic power hydraulic controls for fast, safe, precision . . . easy, fingertip operation that actually encourages the operator to push the machine to its high limit *throughout the shift!*

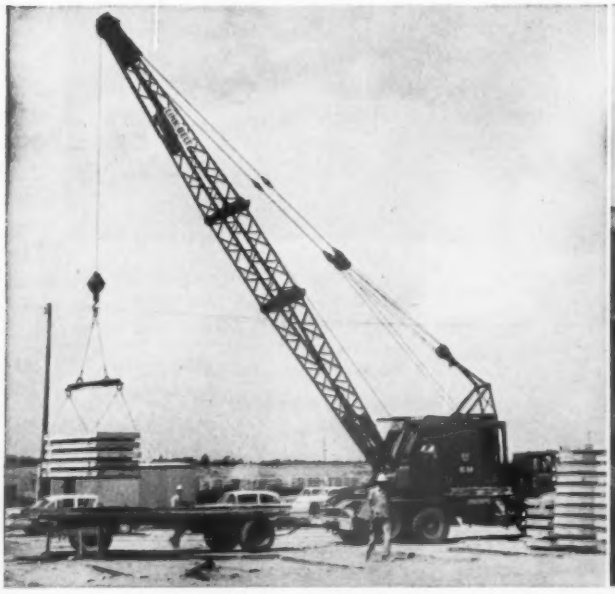
● **BONUS USABLE HORSEPOWER:** Similarly rated shovel-cranes, using the same make and model engine, deliver widely varying amounts of power at the drums. The strength of structural and power train components plus anti-friction bearings, machine cut gears, and splined shafting mean a Link-Belt Speeder can take full advantage of available engine power . . . bull through toughest cuts.

PROFIT MAKERS

21 FAST AND RUGGED CRAWLER MODELS

● **MORE STANDARD FEATURES, MORE OPTIONS:** With a Link-Belt Speeder you get many profit-making standard features that may not even be furnished as optional features on other machines. And, in addition to these standard features, you can choose from an exceptionally wide range of optional features which tailor the machine for extra profits.

For detailed information on Link-Belt Speeder's 31 profit making shovel-cranes, see your distributor or write: Link-Belt Speeder Corp., Cedar Rapids, Iowa. 14,022-A



6 BIG-CAPACITY TRUCK-CRANES
—all with optional remote control

4 SELF-PROPELLED MODELS

LINK-BELT SPEEDER

It's time to compare . . . with a Link-Belt Speeder

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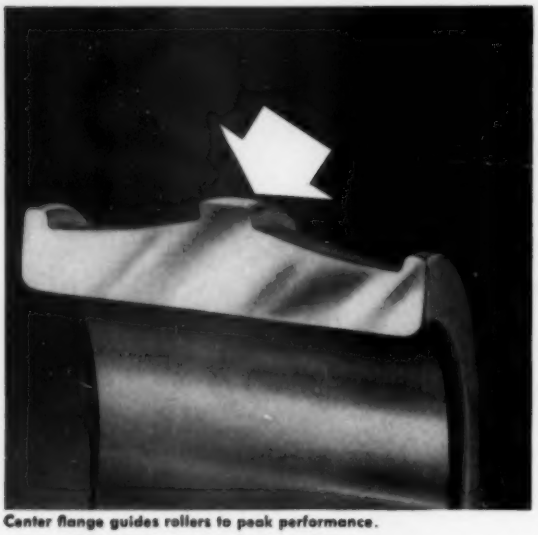
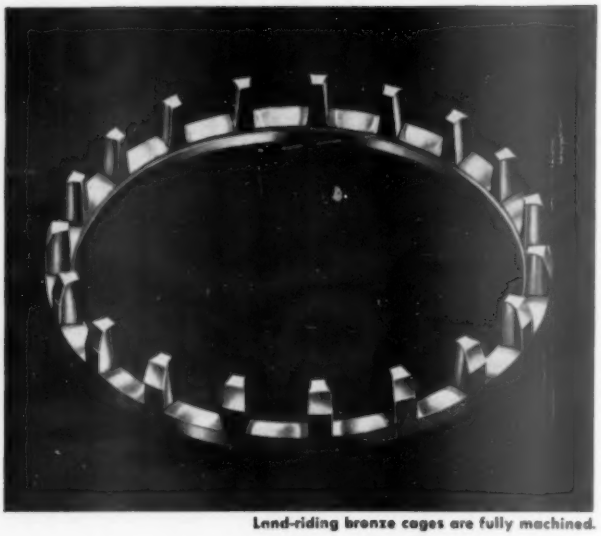
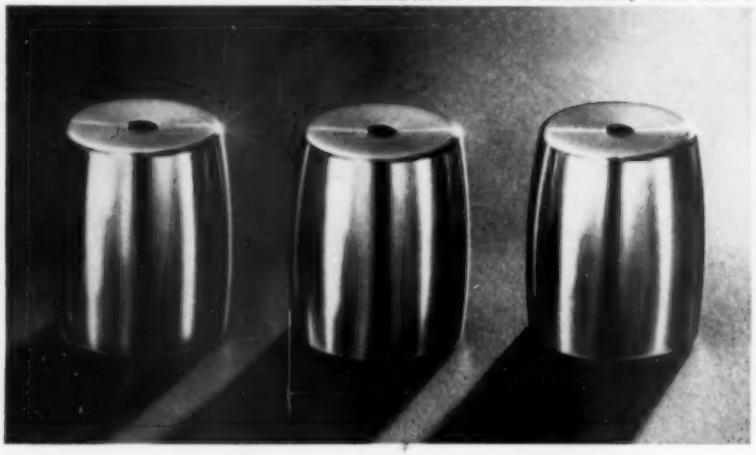


Center flange guides rollers to peak performance.



Land-riding bronze cages are fully machined.

Roller diameters are matched electronically within .0001".



Consider every design feature and you'll choose Torrington!

Torrington has compromised none of the operating design features of its Spherical Roller Bearing, because application experience has proved them essential to superior bearing performance.

There's no substitute for the stabilizing effect of the integral center guide flange. Torrington's asymmetrical roller seeks this flange under load. Skewing and stress concentrations are eliminated. Every roller carries its share of the load, for roller diameters are matched electronically within .0001" for even load distribution.

Rollers are precisely spaced by fully machined land-riding bronze cages that withstand even the high stresses of eccentric service. Two independent cages, one for each row, prevent roller drag and side stresses under thrust loads. Size-stabilized races prevent "growth" or change in dimension in service.

These features mean a cooler-running, longer-lasting bearing. When you buy bearings, look into *every* detail, and you'll choose Torrington. **The Torrington Company, South Bend 21, Ind.—and Torrington, Conn.**

Superior performance features of TORRINGTON SPHERICAL ROLLER BEARINGS:

- Integral guide flange for roller stability
- Asymmetrical rollers seek flange for positive guidance
- Electronically matched rollers
- Size-stabilized races
- Fully machined land-riding bronze cages
- Controlled internal clearances
- Even load distribution
- Inherent self-alignment
- Long service life

Send for new Spherical Roller Bearing Catalog No. 258

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Washington Letter

Edgar Poe

Unions and U.S. blamed For jobless

The Federal Government and labor unions are primarily responsible for U. S. unemployment. So declares the U. S. Chamber of Commerce after extensive research. Federal minimum wages, restrictive union rules, subsidies and other rigidities have increased labor costs so much that businessmen everywhere are substituting machines for manpower. Union leaders generally concur that automation is a major contribution to high unemployment.

The Chamber maintains that if unions and the Federal Government will quit throwing up barriers which curb shifts of workers and resources, the economy would be able to absorb most of the jobless.

State laws Cut by U. S. High court

State powers, which have taken a judicial beating from the Supreme Court of the United States for the past decade or so, have been trimmed again. The nation's highest court ruled that states cannot apply their own antitrust restrictions to labor contract provisions authorized by federal laws. With Associate Justice Brennan penning the majority decision, the tribunal ruled that only Congress has the power to limit the scope of labor-management agreements permitted under state law.

The decision grew out of Ohio court rulings that would have prohibited union efforts to include in its labor contracts with truck firms special provisions to cover amounts paid to drivers who own their own trucks but drive for a company. The state courts of Ohio held that such drivers were independent contractors, and union restrictions on their pay amounted to a restraint of trade in violation of state antitrust laws.

Population Rise brings Problems

The yearly population increase of 3 million persons in the United States is having a great impact in numerous ways. It is apparent on all sides that a tremendous amount of public and private construction will have to take place each year for the next decade to keep pace with the growth. As new chapters of progress are rolled up along construction lines, new problems are creeping up. The National Sand and Gravel Association, in its annual report, made this pertinent observation:

". . . The very question of available space for sand and gravel and ready mixed concrete production is an acute one in many localities. As our population expands and the need arises for more residential areas, for new homes, new schools, new churches, new commercial centers and new industrial plants, the land space problems of the sand and gravel producer and the ready mixed concrete producer will grow in intensity . . . Either we will solve these problems on our own initiative and enterprise, or they will be solved for us politically . . . The association is now much more prominently identified in the programs of nationwide organizations which are concerned with community planning and with effective land use."

Transportation Department?

The proposal of Dr. Walter Adams, professor of economics at Michigan State University, that the Interstate Commerce Commission be abolished gained no outward support on Capitol Hill. On the other hand, the Adams suggestion touched off among members of the House Interstate Commerce Committee an informal discussion that a Department of Transportation be created in the future. All forms of interstate transportation would come under the jurisdiction of such a department.

Court upholds Road use tax A ruling by the Supreme Court of the United States probably will open up a new tax source by some states. The Nation's highest court holds that highway freight carriers are subject to a state's taxes even though the carriers own neither buildings nor other physical property within the states. The decision, affirming the Supreme Court of North Carolina, allows a state to tax that part of an out of state carrier's income earned within its borders.

Minimum Wage hike Despite the lobbying campaign conducted by labor in its $1.25-an-hour minimum wage, Congress is not expected to pass the measure this session. Neither is it likely to pass the bill to extend coverage to 7,000,000 additional workers, but the latter has more favorable prospects with a compromise proposal. The 35-hour work week will not pass. Approximately 24,000,000 people are now covered.

Passenger Tax repeal Pending Congress at the 1958 session repealed the 3 percent freight tax, a move designed primarily to aid the over-regulated railroads but affecting other modes of transportation. Chances now appear favorable that the law-makers will repeal the 10 percent federal excise tax on passenger transportation. The impost was passed early in World War II to discourage passenger travel. It is still doing just that. Senator Claude Smathers (D., Fla.), who steered the freight-tax repeal to passage, expresses confidence his passenger tax proposal will be passed by Congress.

Salvador's Cement plant Increase in industrial activity has helped to diversify and strengthen El Salvador's economy. The World Bank in Washington which has made a $3,000,000 loan to the Latin American Country for electric power expansion, says among El Salvador's new industries is a 45,000-ton cement mill.

Engineering Enrollments Decline The Secretary of Health, Education and Welfare, Arthur S. Fleming, is apprehensive over the drop in engineering enrollments during the current academic year. The decline came after a gradual increase of seven consecutive years. Total engineering undergraduate enrollment was 256,995 as compared with 268,761 for the fall period of 1958, a 4.4 percent decrease. Government officials maintain that more and more engineers are going to be needed by private industry and government in the immediate years ahead. For instance, companies engaged in the rapidly growing missiles industries have stepped up their efforts to recruit engineering talent.

Aggregate use Varies By states A running three-year average of the tonnage of aggregates being devoted to Federal-aid highway construction showed that for every million dollars of total cost approximately 100,000 tons of aggregates of all kinds are used. The chief of the secondary roads branch of the Bureau of Public Roads, A. C. Leonard, said the aggregate use, of course, varies by states and from year to year within states and from project to project. He added that there was no tonnage breakdown as to the proportion of crushed stone or crushed limestone. However, the American Road Builders Association in a report said that within the aggregates used for highway construction and maintenance, 40 percent of the total tonnage consumed is crushed stone either purchased from commercial sources or produced on the site.

Fresh water Use to double A fresh warning to the nation's industrial users of fresh water comes from the Bureau of Mines. Bureau Director Marling J. Ankeny says that the nation's water requirements for the next 25 years probably will double the present quantity required. Therefore, he declares adequate supplies for the expansion will require major efforts by private and government organizations, not only in constructing new dams, reservoirs, and distribution systems, but also in conserving and reusing our water supplies and controlling pollution.

Every tough job proves it:

You can do more for less

on Tru-Seal Tubeless Rims

Actual performance records prove it – you can cut your costs on the world's toughest jobs—when your tires are mounted on Tru-Seal Tubeless Rims by Goodyear. This is the rim that has been adopted by the Tire and Rim Industry for tubeless replacement of all conventional tire sizes 12:00 and larger.

Tru-Seal is the only practical way known to seal a multiple-piece rim. And like all Goodyear Rims, it offers these practical, moneysaving advantages:

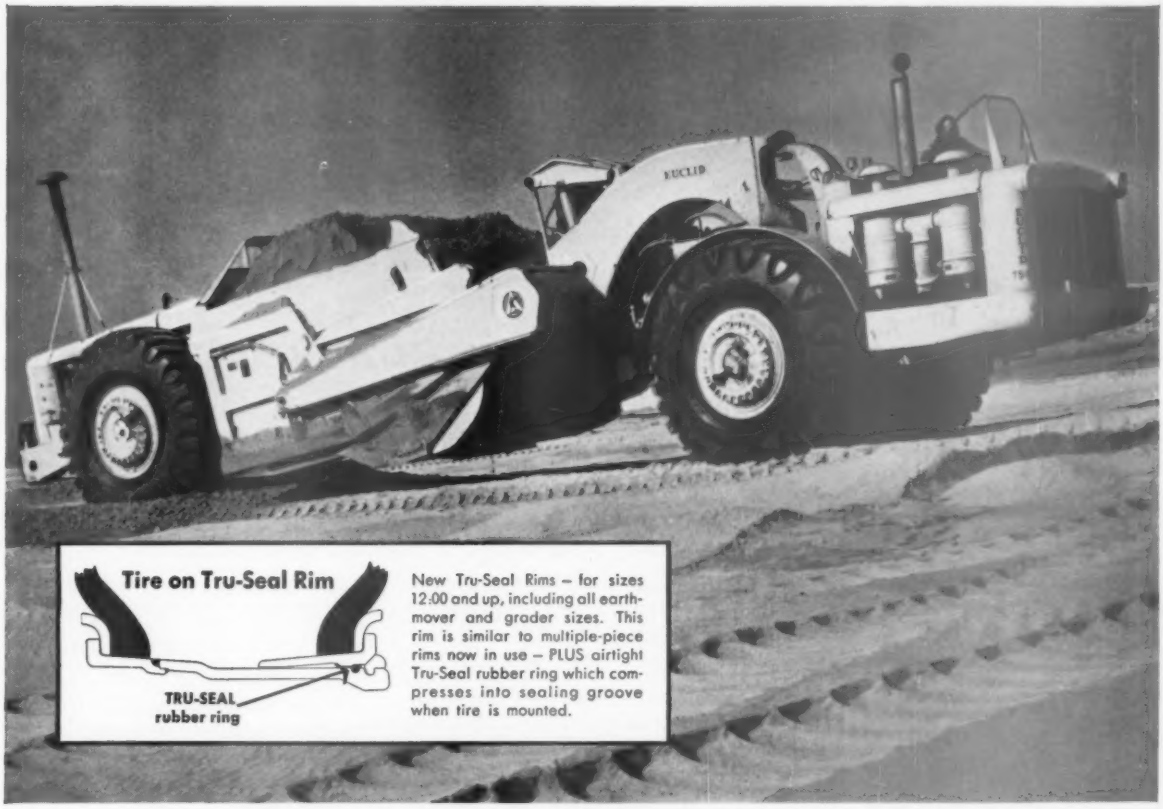
Unusual Strength: Thanks to an exclusive double-welding process, and added support at points of greatest stress, present-day Goodyear Rims are far stronger than previous rims.

Ease of Tire Mounting: No tube and flap troubles.

Special Tools: Goodyear provides both hydraulic and hand tools especially made for off-the-road equipment.

Bond-a-Coat Finish: This protective coating affords long-lasting resistance to rust and corrosion.

If you have a rim problem, talk it over with the G.R.E. (Goodyear Rim Engineer). He'll save you time and money by helping you select the type and size of rim best suited to your needs. Write him at Goodyear, Metal Products Division, Akron 16, Ohio, or contact your local Goodyear Rim Distributor.



New Tru-Seal Rims – for sizes 12:00 and up, including all earth-mover and grader sizes. This rim is similar to multiple-piece rims now in use – PLUS airtight Tru-Seal rubber ring which compresses into sealing groove when tire is mounted.

Buy and Specify **GOODYEAR**

More tons are carried on Goodyear Rims than on any other kind

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Watch "Goodyear Theater" on TV—every other Monday, 9:30 P.M., E.S.T.

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▲ Accent on rubber is evident from Holloway's line-up of equipment. Note the two Michigan Tractor Shovels, the two Michigan Scrapers, and the Michigan Dozer—all on rubber.

Matched earthmoving team—Michigan Model 280 Dozer push-loading Michigan Model 210 Scraper—picks up 18 tons of sand-silt-clay overburden in 40 to 75 seconds. Later, same machines will load gypsum. Average payload in this material: 16½ tons. ▼

Gypsum producer halves machine needs, cuts operating costs, yet raises output. The "key":

His Matched Michigan Tractor

Operating efficiency has hit an all-time high—and costs an all-time low—for H. M. Holloway Inc., California's largest producer of gypsum.

Main reason is a switch in their work fleet from crawler to rubber.

Two 19-yd Model 210 Michigan Scrapers now handle both overburden removal and gypsum mining. These units are the only Scrapers on rubber which have proved capable of climbing up soft sand-silt stockpiles.

A Model 280 Michigan Dozer handles scraper push-loading. Its 262 hp on rubber has cut average load time from 2½ minutes to under 1 minute.

Two Model 175A Michigan Tractor Shovels load the finished gypsum . . . 22 ton trucks in less than 4 minutes each.

With scrapers, dozers, and loaders all one make—all with similar power trains, controls, engines, tires, etc.—Holloway gets the benefits of lower parts stocks . . . easier operator training...easier servicing.

Michigans have brought about *much lower operating costs, too.* Holloway's records show total hourly costs for each machine (wages, fuel, maintenance, parts, depreciation, insurance and taxes) to be equivalent to what they were previously spending on *crawler track maintenance alone,* according to H. S. Holloway, company president.

"We now mine, mill, and load over 3,000 tons of gypsum a day," says Claude Knox, company v.p.

"The Michigan Dozer and Scrapers, three units, do *twice the work* of the *six* crawler-mounted rigs they replaced," adds Mr. Holloway.

"What's more," he says, "we used to remove no more than 3 ft of overburden to get at 3 ft of gypsum. Now, the ratio has been cut to 3 ft of overburden to *2* ft of gypsum . . . so layers once wasted are now profitably mined."

Overburden removal: 2,500 tons every 9 hours

In typical operation, the Michigan

▲
Scraper unloads silty overburden on 35 to 40-foot-high stockpiles over wasteland. Once considered a crawler job (other rubber-tired scrapers tried and failed), the Michigan handles hill-climbing on free-running silt with comparative ease.
▼

◀ Michigan Tractor Shovel attacks gypsum stockpile, loads 2¾ to 3 cu yds per "bite." Typical 22 ton truck takes 6 passes, 3½ minutes.

Dozer-Tractor Scraper fleet

Dozer-Scraper three-unit team strips 2,500 tons of overburden every 9-hour shift. By building dump piles 35 to 40 ft high in adjacent-mined-out areas, double-handling is eliminated, also haul distances are kept under 1,000 ft. This, incidentally, is the job no other rubber-tired Scraper could do; success of the Michigans in climbing the free-running silt is attributed by Mr. Holloway to their excellent balance, power-shift-torque converter drive, and high ratio of horsepower to loaded weight.

Same units mine gypsum

When all overburden has been removed from a work area (usually 400 x 800 ft), the Michigan Dozer-Scraper team keeps right on working, removes the layer of gypsum. This material is dumped in windrows, roughly 11 ft wide, 2 ft deep, 600 ft long.

Tractor Shovels load 2,200 tons daily

Next step is processing—300 tons per hour—and the final step, once the ready-to-use, one-inch-minus material is spewed by a conveyor into large stockpiles, is loading. This last job is handled by two 2¾ yd Michigan Model 175A Tractor Shovels. Their output averages 2,200 tons per unit per day.

Demonstrate? Glad to!

If *you* are one of the *11,000 owners* of Michigan Tractor Shovels, we urge you to look into the added efficiencies of having the same power train in *your* Dozers or Scrapers. Pick the Michigan model and size you'd like to see . . . then call to arrange a demonstration. Michigan Tractor Shovels are now available in bucket capacities of 16 cubic *feet* to 6 cubic *yards* . . . Dozers: 165, 262, 375, and 600 hp . . . Scrapers: 10½, 19 and 29 yards.

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Construction Machinery Division

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How would you decide?

A round-up of actual day-to-day in-plant problems and how they were handled by management men

Can you discipline union officers if employes go out on an "unauthorized" strike?

What Happened: The union contract had the usual "no strike" clause. One morning, a group of employes in one department protested to their supervisor that they should receive average hourly earnings on a certain job. The department head listened to their complaint, and said he would have an answer for them the following morning. The next day the supervisor told the group that they were not entitled to average hourly pay. This made the employes unhappy. Instead of taking their grievance to the second step, they went out on strike. They returned two days later. Before the strike, the union president and the shop steward did very little to prevent the walk out. After the men returned to work, the company gave the union officers a four-week layoff on the grounds that they had been neglectful in their duty to do all in their power to keep the men on the job. The union defended its officials, arguing that they should not be singled out for discipline. If discipline is called for, then all the workers should be made to suffer the consequences of their actions.

Each incident given in this department is taken from a true-life grievance which went to arbitration. Names of some principals involved have been changed for obvious reasons. Readers who want the source of any of these cases may write to *Rock Products*.

Was the union:
Right? ☐ Wrong? ☐

What Arbitrator Davis ruled: "Arbitrators have repeatedly held that union officials have a special duty and responsibility to see that 'no strike' clauses in a contract are adhered to by rank and file employes. Compliance with contract obligations is a dual duty. Local union officials are the spokesmen for the workers. They are their leaders, and therefore have responsibilities over and beyond those of the rank and file. Local union officials are obligated *aggressively to oppose* actions that violate commitments undertaken in good faith. They are bound, by virtue of their office, to set personal examples of opposition to contract violations. They cannot be passive; they must *vigorously* seek to prevent contract violations by their members." The grievance was denied. The arbitrator held that the lay-off penalty was justified.

Can a company refuse to recall laid-off employes and assign the work to an outside contractor instead?

What Happened: Ed Town filed the following grievance: "The company has assigned an outside contractor to paint 5 machines in spite of the fact that I am fully capable of painting these machines and am available for work the company recalls me for."

The company answered that it was cheaper to have the machines painted by an outside contractor than to recall one of its maintenance men. This reply got the union's ire up, and they made an issue of it. At arbitration the union claimed:

1. An employe on layoff is entitled to recall as soon as work becomes available. By subcontracting out the work, management is denying the regular employe his rights.
2. Subcontracting is another term for union busting. It tends to shrink the bargaining unit and weakens the union.

The company had its answers ready:

1. There is nothing in the contract that limits our right to subcontract work.
2. We're in business to stay competitive. If we can save money by farming out work, we'll do so.
3. We have done this in the past and the union never complained. Why all the fuss now?

Was the company:
Right? ☐ Wrong? ☐

What Arbitrator Dworkin ruled: "The company has the right to manage the plant as, in good faith, it deems best. Since there is no prohibition against subcontracting in the union contract, management can farm out work provided the intent is to save money and not as a means of weakening the union. In this case, the company had previously subcontracted work and there was no complaint from the union. Therefore management retains the right to continue its practice. The grievance is denied."

(Continued on page 30)

Enter 1296 on Reader Card

Why Wyandotte Chemical Corp. chose this dozer *(a Michigan)*

"Like most quarries, we have a lot of widely-scattered, repetitive jobs to do," writes William Hagen, veteran manager of Wyandotte's big Alpena, Michigan, limestone quarry. "Trouble was, our crawler-dozers just couldn't handle 'em efficiently—moving, as they must over rocky surfaces, at only a couple of miles per hour. And the cost of track maintenance was pretty awful. Major cause of track wear is travel, of course . . . so we tried to limit *both* as much as possible by putting a crawler on each operating level and another on the stockpiles. Didn't help much, though. Breakdowns would still upset our schedules *several days per week*. So we decided to look at some rubber-tire dozers." They tried one type. It was unsatisfactory. Then Wyandotte's local Michigan Distributor, Michigan Machinery & Equipment Co., arranged an on-the-job demonstration.

Makes hour crawler move in 7 minutes

"From the moment our trial Michigan drove off the flatcar, it was *busy*," Hagen continues. "First job on the docket was leveling a dump area on our macadam storage pile. The Model 180 dozed enough area to last an 8-hour shift —in only 28 minutes! Then, because *two* of our crawlers were down for repairs that day, we drove the Michigan a mile to our shovel loading area. *In less than 4 minutes* it was at work, cleaning up ahead of the 6 yard electric shovel and opening the way for trucks. Half an hour later, we moved back to macadam storage —a 3-minute trip this time. One of our crawlers would have taken a whole hour for the 2 mile round trip alone! Later, the Michigan assisted in moving our big quarry shovel; transfer of the power feed cable and area cleanup were handled faster than ever before. We also used the Model 180 Dozer to move drilling machines, air compressors and shanties . . . to strip shallow overburden . . . clean around the surge bin . . . maintain roads . . . and to level the flux stone stockpile. Nowhere in these operations did the Michigan have a bit of trouble. With performance like *this*, we were sold!"

Only 1 repair job in 5,800 hours

Hagen finds their Michigan today does all of these tasks and many more around this 450-acre quarry. The Model 180 actually works 16 hours a day, 7 days per week. Quarry Superintendent B. C. Raymond estimates its tire wear to be *1/6 as costly* as track maintenance on the crawlers. Its mechanical efficiency has been excellent . . . in the past year, it has been down for repairs *only once*. Operators say "Michigan drives like a new car . . . avoids constant jarring of a crawler . . . gets us on the spot *fast* . . . has fine visibility fore and aft. *We like it!*"

Want to move in on bottlenecks too?

We'll bet a Michigan Dozer can break production bottlenecks for *you*, too. Won't cost you a cent to find out—your local Michigan Distributor will be glad to arrange a thorough demonstration. You pick the time. You pick the job. No obligation, of course. And ask him about the popular Clark Lease-Purchase Plan, which lets you put a Michigan to work without investing a penny of capital. Other finance plans available—choose the one you like best!

Michigan is a registered trademark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2481 Pipestone Road,
Benton Harbor 35, Michigan

In Canada: Canadian Clark, Ltd.,
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CLARK® EQUIPMENT

LIPPMANN FIELD REPORT

Schuster Constr. Co. adds second Lippmann plant

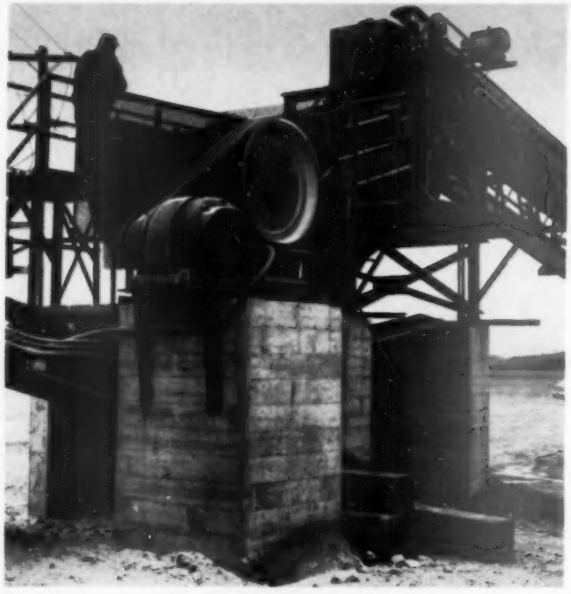
. . . ups production to 3500 tons per day!

Ed Schuster

The largest sand and gravel producer in their area, Schuster Construction Co. of Green Bay (Wisconsin) operates two high-capacity plants at separate pit locations. Crushing plant at their "Denmark" pit was installed in 1953... completely Lippmann designed-and-equipped. Last year, when tonnage requirements called for opening a second pit, Lippmann was again called in to handle the complete installation. In fact, for the last *27 years*, this successful producer has used Lippmann equipment to maintain a competitive bidding edge. Story of current 3500 ton/day operation is told at right.

Want facts that will help you evaluate Lippmann extra-productivity for *your* operation? Drop us a line... we'll send details promptly without obligation.

About 50% of the production from Schuster's two pits is used to supply their busy 19-truck redi-mix plant in Green Bay. Schuster also supplies a growing contractor market... including a considerable amount used in their own contracting activities. Schuster will handle a $1.3 million paving contract this summer.



▲ **New pit at Casco** has been in operation nearly one season, produces 220 tons per hour (of which 175 tons is minus ¾") with 40% primary crushing. Lippmann designed-and-equipped plant is completely push-button controlled. One man can oversee and start-or-stop any phase of operation from dual control panels at both ground and catwalk level. Plant turns out 6 products simultaneously (two grades of sand, crushed stone, and 3 sizes of ballast). Downtime to date: Zero.

◀ 15 x 36 Lippmann "Grizzly King" handles primary crushing at Casco pit. Size for size, Grizzly King's have deepest jaw plates and greatest "throw" of any crusher on the market. *Naturally*, this means more crushing area, more crushing force per cycle, more *production* per hour. And, Grizzly King's have the extra-rigid frame, dynamically balanced fly-wheel, and husky shaft-and-bearing assembly to take this higher production in stride.

◀ Following secondary reduction by Lippmann 30 x 20 roll crusher, sand is screened out and fed to classifier. Coarse materials are fed to Lippmann scrubber (shown at left), followed by 2 additional stages of washing and screening.

▲ Lippmann installation at Schuster's pit near Denmark (Wis.) has been in operation since 1953. Handling 70% reduction of hard glacial gravel, plant consistently produces 180 tons per hour. Based on 5 years' excellent all-around performance, Lippmann won repeat order for new installation at Casco.

◀ Lippmann 24 x 36 "Grizzly King" jaw crusher at Denmark pit handles "everything the one-yard shovel will feed it." Says president Ed Schuster, "This is really a top-flight plant. I'll put Lippmann crushers up against *any* that are made."

SC-M-2-59

LIPPMANN ENGINEERING WORKS, INC.

4603 W. Mitchell Street
Milwaukee 14, Wisconsin

Labor Relations

continued from page 26

What must a union do to stop a wildcat strike?

What Happened: When 22 employes walked off the job and stayed out for two days, management decided to punish the union officers. They were fired. The discharged men protested:

(1) We agree that under the no-strike clause in our contract the union has responsibility to keep men on the job and use the grievance procedure to settle disputes.

(2) This was not a wildcat strike. It was a spontaneous act of the employes who were sick and tired of management's stalling on grievances.

(3) The men were so angry that we couldn't control them. We had no alternative but to punch out after the workers left.

(4) We finally got the men together and had them return to work.

The company said:

1. Sure you got the men back to work—2 days *after* the walkout.
2. You made no active effort to stop the men from wildcatting.
3. What good is a "no-strike" clause if the union officers won't enforce it?

Was the company:
Right? ☐ **Wrong?** ☐

What Arbitrator Crawford ruled: "The Local Union effort to escape responsibility for 'condoning' the strike is found in the statement that it asked the men to return to work. Missing from the events of those two days are the positive actions which one associates with a sincere effort to persuade wildcat strikers to return to work: a membership meeting, distribution of leaflets to members, use of TV and radio, presence of Local Union officials at the plant gates urging the men to work, and the setting of an example *by returning to work.*

"One excuse given by the union president was that 'The company didn't ask me to arrange a meeting and get the people back to work. I have no permission to address the people in the shop and the officers and stewards were busy on union business.' This is hardly a picture of Local Union leadership concerned with responsibilities for honoring the no-strike pledge. The Local Union did aid and condone the stoppage by the participation of the officers in the strike and by failure to take any realistic steps to get its members back to work."

During a layoff, can a senior employe "bump" a junior worker who is in a higher-rated job?

What Happened: Wilson and Burton were both good workers and about equal in skill. Burton, though he had two years less seniority than Wilson, was working in a job classification that paid 10c an hour more. The company had a plant-seniority setup in which, during a layoff, a senior employe could claim any job for which he was qualified. When a layoff was scheduled, Wilson put in a claim for Burton's job even though it paid a higher rate than his own task. The company said "no" for the following reasons:

1. Bumping by seniority was never meant to provide a means for getting a promotion.
2. Bumping by a senior employe means "downward."
3. Wilson never earned the right to hold the higher-rated job.
4. Higher-rated jobs should be gotten through promotions, and not by way of layoffs.

Wilson was not convinced by these arguments. He claimed:

1. The policy says that a worker can bump into "any job." I take that literally.
2. I have the skill to handle Burton's job. Test me if you like.
3. I don't agree that bumping means "downward" only. That's your interpretation, not mine.

Was the worker:
Right? ☐ **Wrong?** ☐

What Arbitrator Burris ruled: "The contract clause 'any employe who is involved in such reduction of force may exercise his plant seniority to claim *any job* for which he can qualify,' contains no qualifying or limiting word, but simply states that such an employe can claim 'any job for which he can qualify.' Wilson is entitled to Burton's job."

Can an employe be laid off for not meeting production standards?

What Happened: Over a period of 8 months, Mrs. Karl's efficiency rating ranged from 69.2 to 76.5 percent. The company considered an efficiency of 85 percent to be "good." After several warnings, Mrs. Karl was given a 5-day disciplinary layoff. The union appealed her grievance to arbitration, arguing:

1. We never agreed to an 85 percent efficiency figure. This is strictly the company's standard.
2. Standards of production should be negotiated and not set unilaterally by management.

The company answered:

1. Our production standards are based on extensive studies. We distributed explanations of these standards to our employes, and every month we give the workers a report on how they are doing. In these reports we repeat that 85 percent efficiency is considered to be "good."
2. There is nothing in our contract with the union which requires joint setting of standards. This is a management prerogative.

Was the company:
Right? ☐ **Wrong?** ☐

What Arbitrator Eckhardt ruled: "The relationship of employer and employe begins with an assumption that the employer manages the business and directs the employes. Unless he modifies his rights by contract, or his control is limited in some other way, the employer has an absolute right to make final determinations in these matters.

"As to the duty of the company to bargain on this plan, the Agreement does not specifically so require. Throughout its history the company has discharged for poor production whether under the standards of production system or not. Whether or not such standards are specifically stated does not alter the authority. For example, if a worker decides to do nothing—or produces only one piece when 50 pieces are produced by the average fellow-employe—the company can discharge. To hold that a company cannot discipline for failure to produce would make warnings completely ineffective." **END**

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More than a catalog, this new Book 2779 offers many cost-saving ideas for estimating and selecting the most rugged combination of standardized components best suited to your operations. It's the ideal book for engineers and plant operators who want to keep pace with the latest developments in Pre-Bilt sectional belt conveyors. You'll see how others have solved difficult bulk materials handling problems. There's a complete section on typical layouts, and many others, to help solve your particular problem.

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PEOPLE

IN THE NEWS

Research post to Gauthier

GERARD A. GAUTHIER has been named director of business research by Peerless Cement Co., Detroit. As chief of the newly created business research department, Mr. Gauthier will work on company planning, business and market forecasting and budgeting. He has been with the American Cement Corp. division for 10 years in engineering and administrative staff positions.

Purdy and Anderson promoted at Universal Atlas Cement

CHARLES C. PURDY, supervisor, financial analysis, has been appointed general supervisor for cost and statistics by Universal Atlas Cement Division, United States Steel Corp., New York City. He succeeds Ralph V. Anderson, who is appointed assistant to the comptroller.

Davidson joins Arundel Corp.

JOHN E. DAVIDSON is joining The Arundel Corp., Baltimore, Md., as assistant to the president. He has had wide construction experience, including jobs as supervisor of construction of the $400 million gaseous diffusion plant at Oak Ridge, Tenn., and manager of the $200 million Hanford, Wash., plutonium works, both atomic energy projects. More recently he has been executive vice president of Williams-McWilliams Industries, and has worked on special assignments for Utah Construction Co.

Davis joins K-M research

WILLARD DAVIS has been named supervisor of new process and new product investigations in the research and development department of Keasbey & Mattison Co., Ambler, Pa. Mr. Davis was with Sun Oil Co., Philadelphia, Pa., as an operations research engineer. He holds a B.S. degree in chemical engineering from Northeastern University, Boston, Mass. Keasbey & Mattison makes asbestos, asphalt and heat insulating products.

PCA names Petzar district engineer

GEORGE M. PETZAR, formerly of the Los Angeles office, has been named district engineer of its new Phoenix, Ariz., office, the Portland Cement Association announced. Established to better serve cement users in the state of Arizona, the office will supervise the work of the two field engineers. Gene R. Morris continues as general field engineer in the Tucson, Ariz., office; a field engineer will be named later who will work out of Phoenix.

Mr. Petzar joined the association in 1954 as a general field engineer, most recently specializing in technical service in the field of housing.

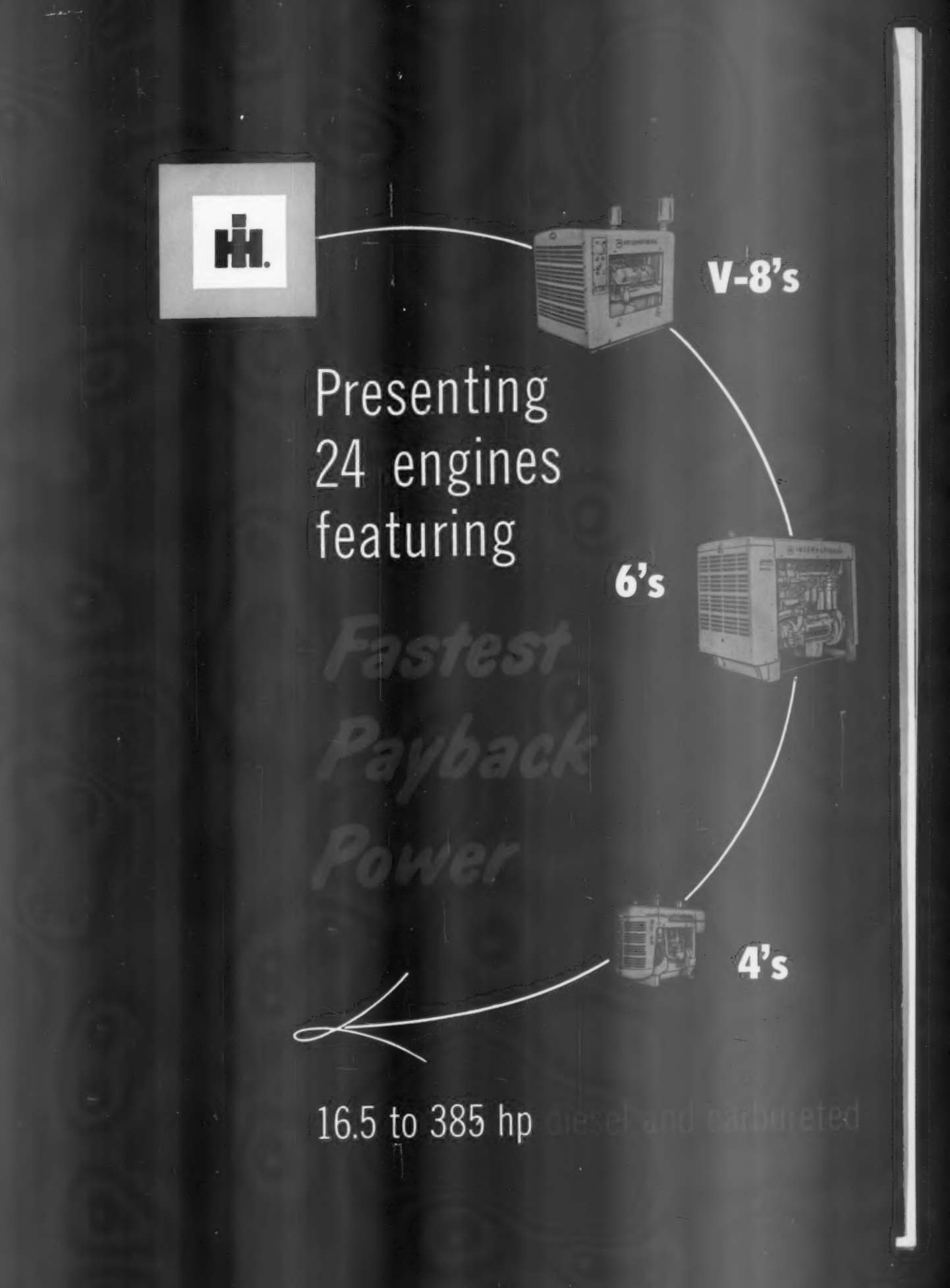
Jellick appointed consulting engineer to cement agency

J. E. JELLICK, manager of the Portland Cement Information Bureau's office, has been appointed a consulting engineer for the bureau. He will continue to serve construction and design people who request information about concrete or inspection of concrete construction jobs. He is knowledgeable in concrete, having developed a fog spray to prevent shrinkage cracking in slab concrete; recently he wrote suggested specifications for interior cement plaster. The bureau is supported by three west-coast cement makers, Calaveras Cement Co., San Francisco, Pacific Cement & Aggregates, Inc., San Francisco and Permanente Cement Co., Oakland, Calif.

Deely studies Korean building materials

JOHN M. DEELY, JR., vice president of Lee Lime Corp., Lee, Mass., is a member of a four-man U. S. team sent to South Korea to survey that nation's building materials. Financed jointly by the U. S. and South Korean governments, the team consists of Mr. Deely, a geologist from Kansas, an architect from Detroit and a brick manufacturer from New York State.

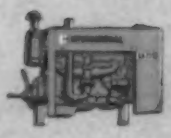
The men planned to stay eight weeks, preparing a report on raw materials, quality, methods of manufacture, marketing and uses of building materials. The report is to be submitted to both governments. The U. S. state department is in charge of the mission, carried out under a program of economic assistance to underprivileged areas. *(Continued on page 37)*


V-8's
Presenting
24 engines
featuring
6's
Fastest
Payback
Power
4's
16.5 to 385 hp

UC-60
16.5 max. eng. hp

UC-135
42 max. eng. hp

UC-221
75 max. eng. hp



UB-220
83 max. eng. hp

U-308
92 max. eng. hp

UC-263
95 max. eng

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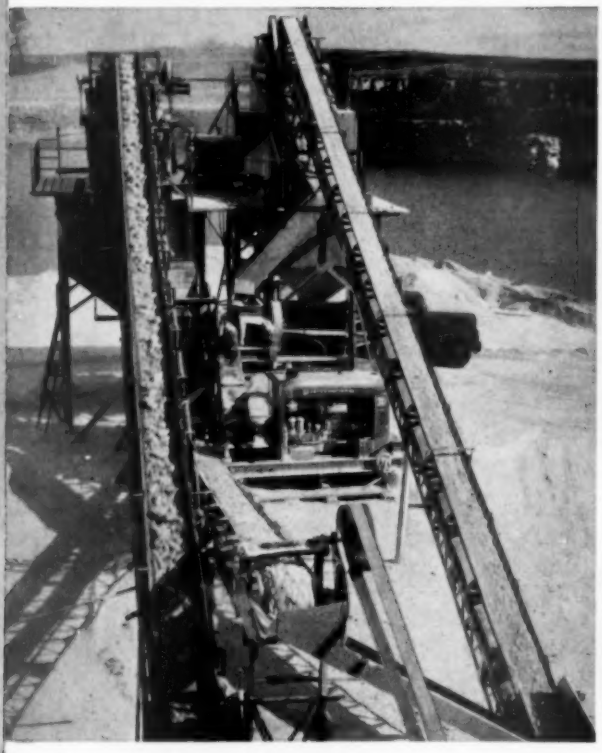
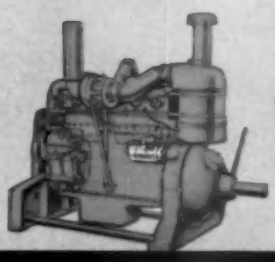
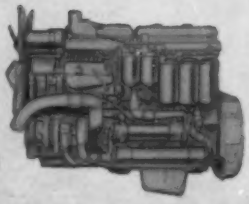


UDT-817
375 int. eng. hp

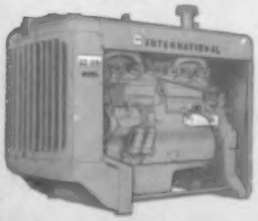
UDT-1091
265 int. eng. hp



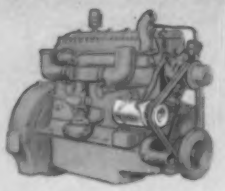
UD-817
240 int. eng. hp



UD-1091
216 int. eng. hp

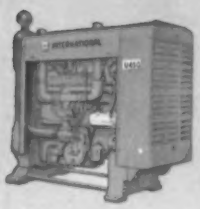


63
x. eng. hp

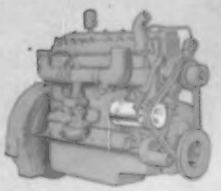


U-372
110 max. eng. hp

UB-264
112 max. eng. hp



U-450
134.5 max. eng. hp



U-501
141 max. eng. hp

UV-401—170 max. eng. hp

UV-461—179 max. eng. hp

UV-549—222 max. eng. hp

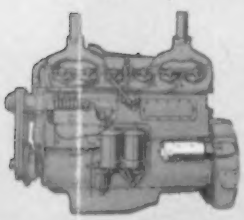
U-1091—248 max. eng. hp
(nat. gas)

CARBURETED

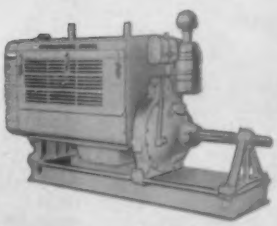
DIESEL

UD-236—70 int. eng. hp

UD-554
140 int. eng. hp

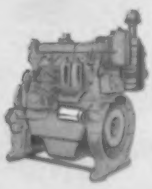


UD-18A
131.5 int. eng. hp

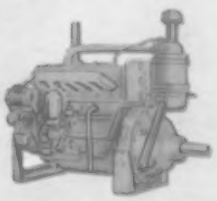


UD-14A
105 int. eng. hp

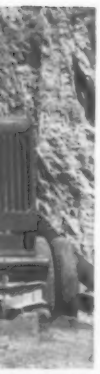
UD-370
95 int. eng. hp



UD-282
90 int. eng. hp



wer starts with your equipment engines



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International engineers with over a half century of heavy-duty engine design experience make fastest payback power the common feature of all International engines through lowest cost operation, long-working stamina, thorough sealing, and minimum maintenance.

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All 24 models are available from stripped engines to complete power units. A wide variety of accessory equipment including air cleaners, flywheels for leading makes of torque converters and clutches, torque converter coolers, air compressors, safety shut-offs, instruments and engine controls can be furnished for your installation requirements. Bases, radiators, hoods and dashes, clutches and power take-offs can be ordered for complete power units.

Get full details on any model from your International Power Unit Distributor or Dealer, the man who sells and services fastest payback power.

Your choice of engine sizes and fuels, all with *Fastest Payback Power*

Your International Power Selector

	MODEL	RATED RPM	CU. IN. DISPLACEMENT	GASO. HP	LPG HP	NAT. GAS HP
FOURS	UC-60	2500	60	16.8		
	UC-135	2000	135	42	42	32
	UC-221	2400	221	75	75	66
	UB-220		220	83	83	70
SIXES	U-308	2400	308	92	96	82.5
	UC-263	2400	263	95	95	85
	U-372	2200	372	110	101	92.5
	UB-264		264	112	112	90
	U-450	2200	450	134.5	130.5	112
	U-501	2200	501	141	134	120
V-EIGHTS	UV-401	2800	401	170	165	142
	UV-461	2600	461	179	175	162
	UV-549	2600	549	222	215	192
	MODEL					
FOURS	UD-370	2200	370	262 @ 1400	4⅝ x 5½	95
	UD-14A	1800	460.7	325 @ 900	4¾ x 6½	105
	UD-236	2400	236	173 @ 1800	3 11/16 x 3 11/16	70
	UD-282	2400	282	217 @ 1800	3 11/16 x 4.39	90
	UD-554	2300	554	400 @ 1300	4⅝ x 5½	140
SIXES	UD-18A	1600	691.1	473 @ 850	4¾ x 6½	131.5
	UD-1091	1500	1090.6	825 @ 1150	5¾ x 7	216
	UDT-1091	1500	1090.6	1000 @ 1250	5¾ x 7	265
	UD-817	2100	817	638 @ 1600	5⅜ x 6	240
	UDT-817	2100	817	1052 @ 1200	5⅜ x 6	375

NOTE: *For carbureted engines use 90% of max. hp shown for intermittent type application and 80% of max. hp for continuous type application. For diesel engines use 80% of intermittent hp shown for continuous duty application.*

Specifications subject to change without notice.

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180 NORTH MICHIGAN AVE. • CHICAGO 1, ILLINOIS

PEOPLE IN THE NEWS

(Continued from page 32)

Renton named at GasprO

ALLAN RENTON, for 35 years president of GasprO, Ltd., has been elected chairman of the board. His son, Allan H. Renton, is executive vice president and sales manager. The younger Renton has been with the company since September, 1949, and has served as secretary. In addition, he has managed the lime plant and limestone operations.

New staff member

JOANNE MARIE GAMLIN has joined ROCK PRODUCTS as an editorial assistant. She attended the journalism school at Northwestern university and graduated from the University of California, Berkeley, in 1955, with a degree in journalism, English literature and political science. She then returned to her home in Chicago where she entered the journalism field with a copywriting job at Butler Brothers. After one year with this company, she held similar positions with Spiegels and Goldblatts. For the past year and a half, Miss Gamlin has been studying painting at the Academy in Florence, Italy.

McCord joins board

GEORGE S. MCCORD has been elected to the board of Standard Paving & Materials, Ltd., Canada. Mr. McCord continues as president of S. McCord & Co. Ltd., one of the largest ready mixed concrete and building supplies firms in Ontario.

B. A. Monaghan

C. W. Ireland

Monaghan and Ireland elected at Vulcan Materials

BERNARD A. MONAGHAN, executive vice president of Vulcan Materials Co., has been elected president of that firm. He became executive vice president of Vulcan in April, 1958. Prior to that time he was a member of the Birmingham law firm of White, Bradley, Arant, All & Rose. Mr. Monaghan also served as general counsel to the Department of Army in Washington, D.C., in 1952-53. He is a native of Birmingham, Ala., and has received degrees from Harvard and Oxford universities.

CHARLES W. IRELAND moved up to chairman of the board of the same company. Grandson of C. L. Ireland who acquired Birmingham Slag Co. in 1916, he has been president of Vulcan Materials since 1951. He is also chairman and trustee of the Ireland Foundation, Inc., president and director of the National Slag Association, director of the National Ready-Mix Concrete Association, director of the First National Bank of Birmingham. He is a member of Birmingham's Committee of 100, and member of many other community associations.

Robert G. Haaker named at Glacier Sand & Gravel Co.

ROBERT G. HAAKER has been appointed assistant general manager of the Glacier Sand & Gravel Co., Seattle, Wash. He joined Glacier in 1951. Previously he had worked for the Permanente Cement Co., Glacier's parent company.

OBITUARIES

Clarence A. Barron, a director of the Salisbury Portland Cement Co., died in Cape Town on February 2. Mr. Barron was also vice chairman of the Central Africa Building Society and a member of the Rhodesian Board of the Standard Bank of South Africa.

Theodore Kamp, 84, retired gypsum firm official, died in Grand Rapids, Mich., on February 28. Mr. Kamp was superintendent of the former Michigan Gypsum Co.

W. Leonard Ramsay, 83, died in his Kansas City, Kan., home on February 5. He had been employed by the Stewart Sand & Material Co. there for 40 years before retiring as assistant secretary-treasurer in 1948.

Franklin Fuller, 51, of Spring Valley Township, Milwaukee, Wis., died March 5. Mr. Fuller was an operator of the Fuller Sand & Gravel Co.

Ford J. Twaits, 72, former president of Consolidated Rock Products Co., Los Angeles, Calif., died April 18. At the time of his death, Mr. Twaits was partner-founder of Twaits, Wittenberg Co., Los Angeles construction and engineering firm.

Edgar Morgan Barker, vice president in charge of promotion for Calaveras Cement Co., San Francisco, Calif., died March 19 in Honolulu following a short illness. Mr. Barker joined Calaveras in 1947 as manager of the San Andreas, Calif., plant, which position he held until his appointment as vice president in 1953.

Born in Globe, Ariz., Mr. Barker received a B.S. degree in mining and metallurgy from the University of Utah in 1931. For the next two years he worked as underground surveyor for the Union Corp., Springs, Transvaal, South Africa. After serving three years with the Roan Antelope Copper Mines, Ltd., in Northern Rhodesia, Mr. Barker became research engineer for the American Potash and Chemical Corp., Trona, Calif.

Active in mining circles for many years, Mr. Barker was general chairman of the national convention of AIME, held in San Francisco in February. He served as secretary-treasurer of the San Francisco section of AIME from 1954 to 1956, vice-chairman in 1957, and chairman in 1958.

New pit...new Caterpillar machines...

Alexco Aggregates Inc. completely equipped their new Glen Lake, Minn., operation with Caterpillar machines. This includes two Cat Diesel Engines to operate crusher and shaker, two Cat Electric Sets to supply power for the conveyor system. The pit supplies road materials ranging in size from 1½" crushed rock to ¾" asphalt aggregates.

A Cat No. 977 Traxcavator with side dump bucket loads in excess of 3,000 tons per 10-hour day—stockpiles too.

"This machine is ideal for our pit," says Superintendent Bill Grimme. "It's fast, increases production, and is easy on the operator."

Look at these features that pay off in more speed and volume for bigger profits:

Reduced Cycle Time—Less Loading Area—turning to load is unnecessary with the exclusive 2¼-yd. side dump bucket. Maneuvering is confined to forward-reverse movement.

Top Efficiency—Less Load Time—operator has good visibility to cast material accurately and with little spillage. Lift, tilt and dump levers are located for one-hand control. With float and lock-out mechanism, operator can release levers while bucket is in motion. An automatic positioner returns the bucket to desired digging angle. And the bucket can be tilted backward a full 40° at ground level to pry a full load on every pass.

NOW . . . A TOUGHER NO. 977 SERIES D: new track links for greater strength and longer wear; hydraulic track adjusters, already standard on the Series E, now available for the Series D.

FOR THE SERIES E MODEL: new lifetime lubricated rollers and idlers that need no servicing until rebuilding. New triple grouser track shoes, for added traction in soft materials, have low turning resistance and longer wear. The No. 977A Bulldozer has new durability . . . offers added versatility to the No. 977 Traxcavator.

top production from the start

Two D8s with "U" blades make every pass pay off... stockpiling and 'dozing material into crusher hopper.

With the No. 8U Bulldozer you get the shearing action of an angling blade . . . plus the rolling action of a straight blade. Material is forced to the center of the blade where a capacity load is carried the full length of the pass. Spillage over the top or out the sides is reduced. Tests show that 'dozing production is *increased up to 50%* when you replace a conventional blade with a Caterpillar "U" blade.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BORN OF RESEARCH
PROVED IN THE FIELD

THERE'S A NEW D8...
THE SERIES H

. . . with more horsepower, new features to move materials faster and easier than before. Horsepower is up to 225 at the flywheel, 180 at the drawbar. Lugging ability is increased by ⅓.

SIZE INCREASED 4,100 LB.—gauge also increased to 84"; track on ground length to 114"; square inches of contact increased to 5,050.

LIFETIME LUBRICATED ROLLERS AND IDLERS — no service necessary until rebuilding.

DRY-TYPE AIR CLEANER—removes at least 99.8% of dirt in the intake air. Can be serviced in 5 minutes and the element re-used.

Other improvements include stronger, heavier undercarriage; superior operation; high speeds.

Get high production in your pit or quarry by standardizing on Caterpillar machines. They make the hard work look easy. Call your Caterpillar Dealer soon. He's ready to give you a demonstration on your job, under your conditions.

FACES AND PLACES

. . . Candid shots of people in the

Opening a new mine

It is not easy to carve a new mine out of the wilderness, especially when there is an old underground working just below. L. G. Wilson here watches his driller carefully put down a hole into an outcrop of massive barite at Kings Creek, S.C., to start open pit mining

It's not long distance

Bob Mitchell is on the telephone a lot of the time, getting his instructions for controlling the flow of 1,000 tph. of sand and gravel into shipping bins. The White Marsh plant of Harry T. Campbell Sons' Corp. near Baltimore makes 7 blends of gravel and 6 blends of sand. Bob must be on his toes every minute of the time to watch his huge control panel and to keep up with shipments

Quorum call for congressmen

It was not a business session when these lawmakers met with the producers of the National Agricultural Limestone Institute at the annual Congressional Banquet. Senator Estes Kefauver and rock products producer W. Camp Turner, both of Tennessee, renewed their acquaintance with Representatives Harold D. Cooley of North Carolina and Ross Bass of Tennessee while the genial Bob Koch, NALI president, looked on

Smiles of satisfaction

Who wouldn't smile as a brand-new lightweight aggregate plant comes into successful operation? Clifford L. Swanson, plant manager of North Central Lightweight Aggregate Co., and R. Frank Leftwich, President of Aglite Corp. and consulting engineer for the project, observe the shakedown run of the new traveling grate installation. Their new plant will make the first lightweight aggregate to be produced in the Minneapolis area

Drilling problem

The drilling crew at Lehigh Portland Cement Co.'s new Miami plant is explaining that soft, porous coral limestone is a real thorny problem. Hays Jensen (white hat), a plant engineer, appreciates that this is one place that soft rock can be more difficult to drill than hard rock, especially since the hole fills with water almost as fast as it can be drilled

Strictly business

The directors and staff of National Agricultural Limestone Institute are concentrating on the routine of getting registered before buckling down to business. The 14th annual convention of the Institute in Washington was one of the largest meetings in the history of the association; practically every member of the Board of Directors attended their meetings on the opening day

INDUSTRY NEWS

Bulk cement trucks service the many concrete plants not having rail service

Railroads, truckers battle over cement

THE RIGHT TO HAUL CEMENT from eastern mills is a hot question confronting the Interstate Commerce Commission and several state public service commissions. There are 24 applications on file with the Federal commission from truckers seeking the right to do so. The railroads are fighting to retain this business, amounting to 32 million tons and $140 million in gross revenue nationally for 1957. The percent of cement shipped from mills by rail slipped from 71 to 63 percent between 1952 and 1957, according to the Bureau of Mines.

Recently two truckers, M. I. O'Boyle & Son, Inc., and E. Brooke Matlack, Inc., were granted temporary permission by the I.C.C. to haul bulk cement from Maryland and West Virginia. Reportedly the permission was asked partly because a $100-million jet airport at Chantilly, Va., near Washington, D.C., which may soon be built, will require about 5 million bbl. of cement. The site is four miles from the nearest railroad.

But then U. S. District Judge Thomas J. Clary restrained the I.C.C. from granting the permits, at the request of the Pennsylvania and Baltimore & Ohio railroads. They claimed permits were granted contrary to I.C.C. rules and regulations, since no prior hearings were held, and since the truckers would put new rates into operation with only five days' notice, rather than the usual 30 days' notice. The railroads said they can handle the business themselves. The two cement plants involved are the Martinsburg, W. Va., plant of Standard Lime & Cement Co., and Lime Kiln, Md., plant of Alpha Portland Cement Co.

The truckers were then refused permission to haul cement from the two plants. The I.C.C. has again taken the matter under consideration.

Construction industry continues 1959 spurt

CONSTRUCTION DOLLAR VOLUME continued to set records through March, the Departments of Commerce and Labor report. Spending that month was 13 percent over March, 1958, and 9 percent above last February.

Highway building was a very important factor in the rise. As Interstate road program contracts have been let at a quickening rate, total highway spending has risen—by 23 percent in the year's first quarter, the Departments of Commerce and Labor report. The Portland Cement Association notes that contract awards for concrete pavement were up sharply to about 23 million sq. yd. during the quarter. This is a 30 percent jump above the 17.6 million sq. yd. for the same 1958 quarter. Sharp gains in cement shipments for the quarter reflect this highway-building boom (see news item).

Private housing starts rose to a seasonally-adjusted annual rate of 1,390,000 in March, above the 1,350,000 in February and 918,000 of March, 1958. Good weather, plus the likelihood that Federal mortgage insurance programs will continue, boosted the totals.

Pacific Cement & Aggregates buys Hawaiian producer

PACIFIC CEMENT AND AGGREGATES, INC., has announced the purchase of Clarke-Halawa Rock Co. of Honolulu, Hawaii. The island firm operates a rock quarry, a sand pit and has subsidiaries producing ready-mix concrete and prestressed concrete. A final subsidiary is Construction Service Co.

Robert (left) and Allan Clarke examine aggregate at Hawaiian plant

An outstanding recent activity of the firm was to find a substitute for gravel which is scarce in the area. A carefully controlled combination of "borrow" and aggregate in the low-quality deposit has proven to have good compressive strength and is now being used widely as base-course aggregate, crusher run and fill material.

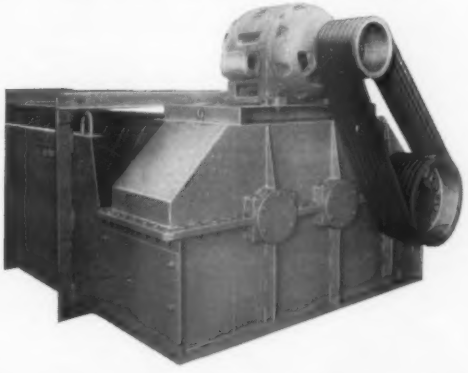
All personnel of Clarke-Halawa will be retained. Robert Clarke now serves as a PC&A vice president and manager of the Hawaiian Division, and his brother Allan is sales manager.

(Continued on page 46)

Fletcher Limestone Co., Inc., Fletcher, N. C., reports:

"Our customers are pleased with the job done by our Eagle Log Washer !"

W. N. LANCE, president of Fletcher Limestone Co., Inc., advises that their Eagle 36" x 30' Double Log Washer scrubs and abrades the crushed limestone delivering a clean, highly preferred product.



The corrugated paddles on the interlocking shafts not only scour the material, but convey it up the drainboard to the discharge opening, permitting the wash water to drain back. Paddle shafts are of tubular steel to prevent deflection. Paddles have replaceable 2-piece Ni-Hard chromium-nickel alloy iron shoes—top half of shoe receives brunt of wear—no need to replace entire shoe.

Totally enclosed gear drive, shown at left, runs in an oil bath—delivers steady power to the massive paddle shafts. Designed throughout for a long, economical service life—little wonder that so many sand and gravel and crushed stone producers are profiting with Eagle Log Washers. Send for the facts—Ask for Catalog 58.

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ENGINEERS • MANUFACTURERS

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Factory-Trained Distributors Everywhere.

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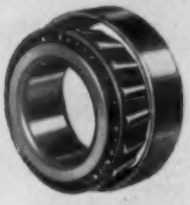
The Positive Seal
PERMA-SAFE
Wheel

Truck wheels, front idlers, support rollers on all models of Allis-Chalmers crawler tractors

Lubricated at factory need no further greasing

Every Allis-Chalmers crawler tractor—whether produced today or any time during the past 17 years—offers its owner the twin secrets of permanent lubrication.

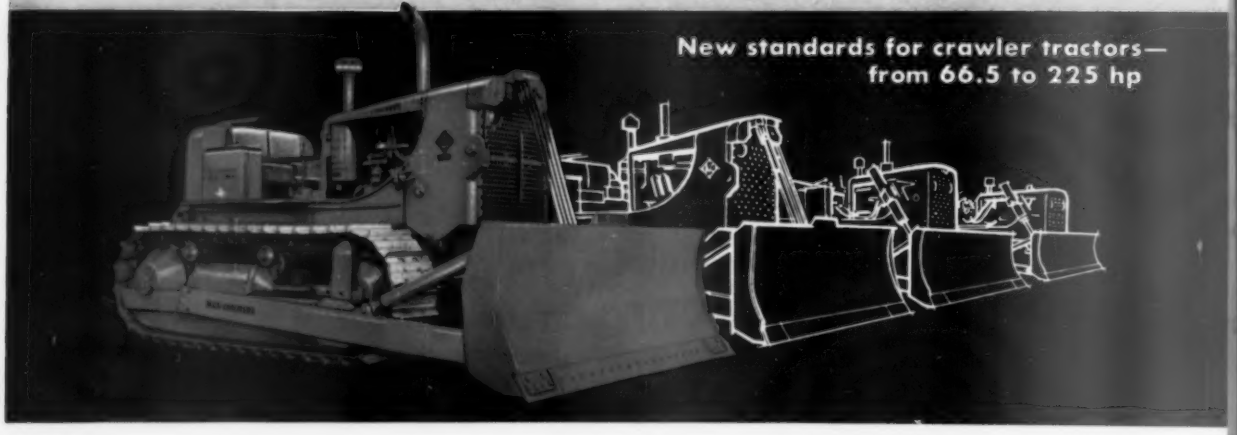
1



Allis-Chalmers tapered roller bearing wheels roll much more freely than ordinary bushing types . . . reduce power-robbing friction . . . give you more of your engine's horsepower at the drawbar or moldboard where it pays off in production. The tapered roller bearings maintain precise alignment of all parts . . . protect the perfect seal by minimizing side thrust and wobble . . . eliminate the uneven wear that makes positive sealing of bushing-type assemblies impractical.

2

The "Positive Seal" that makes permanent lubrication possible is effected by two steel sealing rings working in combination with the tapered roller bearings. These two rings, smoother than glass, are held firmly together by strong steel coil springs. One seal remains stationary; the other turns with the truck wheel. These seals are micro-finished to near perfect flatness. Their surfaces fit together so precisely that nothing can get through . . . a perfect seal.



Safe, permanent lubrication of truck wheels, front idlers and support rollers requires seals that will keep all moisture and other foreign materials out . . . the lubricant in. Only Allis-Chalmers offers seals which are positive because of their use in combination with tapered roller bearings. The Allis-Chalmers Positive Seal, tapered roller bearing design has been proved in the field through more than 20 years . . . through millions upon millions of operating hours. When introduced in 1938, this outstanding design replaced bushing-type assemblies similar to those used today in other tractors. Allis-Chalmers abandoned bushing-type truck wheels because, in its opinion, they could not be positively sealed.

Permanent Lubrication
CERTIFIED

PERMA-SAFE

ALLIS-CHALMERS MANUFACTURING CO.

Your Allis-Chalmers dealer will be happy to help you estimate the savings in time and material that are yours with Allis-Chalmers permanent lubrication. See him today. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

move ahead with ALLIS-CHALMERS

...power for a growing world

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INDUSTRY NEWS

(Continued from page 42)

Mexico gets new cement plant

BAJA CALIFORNIA'S new cement plant, Cementos California, S. A., at Ensenada, Mexico, is taking over sales of a product previously imported largely from the United States. In the future, plant production and the needs of Baja California are expected to about balance each other. Opened August 4, 1958, the plant has been producing from 225 to 250 tons per day of Type I portland cement, which it offers to the public at a price slightly less than that formerly obtained for American cement of the same type.

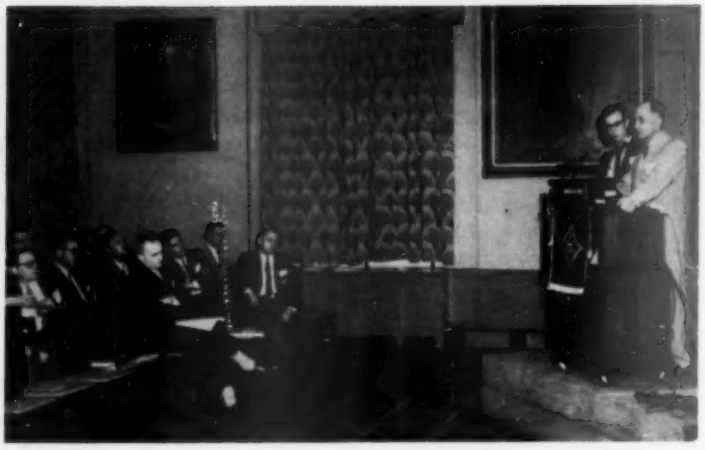
Opportunites for marketing the local product have been practically guaranteed by a protective tariff against imported cement of the same type, so that since the imposition of the duty on August 20 no such imported product has legally entered Baja California. White cement, which the factory does not produce, is not subject to import duty.

According to Cementos California, its plant is the 20th cement producer in Mexico, and with its contribution Mexico will be fourth in Western Hemisphere production, coming after the U. S., Canada and Brazil.

Mobile radio users association reorganized

THE SPECIAL INDUSTRIAL RADIO SERVICE ASSOCIATION has been reorganized and incorporated as a nonprofit organization. Chief aim of the group is the fulfilling of the Federal Communications Commission's requirements for frequency coordination in the Special Industrial Radio Service. The reorganized SIRSA has been recognized by the FCC as the authorized frequency coordination agency for the service.

At their recent semi-annual meeting, the boards of directors of the National Sand and Gravel Association and the National Ready Mixed Concrete Association authorized membership of both associations in SIRSA. Vincent P. Ahearn, executive secretary of NSGA, was designated as the sand and gravel association's representative on the SIRSA board. According to Mr. Ahearn, the NSGA recommends that all members with an interest in mobile radio also join the radio association as individual company members.



Electrical engineers discuss cement industry problems

MANY OF THE OPERATING PROBLEMS of the cement industry are electrical problems. Many production problems can be solved by electrical engineers. To stimulate an open discussion of these problems, the American Institute of Electrical Engineers called a nation-wide conference at Allentown, Pa., in April.

More than 300 cement industry representatives and electrical equipment suppliers responded to the invitation of the Cement Industry Sub-committee. The large attendance at all sessions and the evident interest and enthusiasm was clear evidence to the sponsors of the great need for cement producers to discuss their mutual problems with each other and with manufacturers.

The two-day meeting was divided into two topics—power distribution problems and electrical processing techniques.

The Miami plant of Lehigh Portland Cement Co. was chosen as the ideal cement plant to illustrate a paper on power distribution. Anthony C. Lordi of Westinghouse Electric Corp. collaborated with Lehigh's chief electrical engineer John F. Hower to describe the electrical details of the Miami plant. (ROCK PRODUCTS, May 1959, p. 82.)

This cement plant embodies all the latest thinking and many of the ideal features of a power distribution system. But it was not easy to conform to the foreign and complicated building codes in the Miami area. Nor was it easy to design and install an underground electrical system in an area only a few feet above the water table.

Quarries and primary crushing departments often have unusual electrical distribution needs. Mr. R. C. White of Macdonald Engineering Co. presented the paper on this phase of power distribution. His collaborators were S. C. Cooke of General Electric Co. and T. V. Dudley, Macdonald Engineering.

They outlined the problems of selecting voltages and the proper ways of bringing energy to remote parts of cement plants where a number of different kinds of heavy equipment are operating. The mobility of quarry machinery makes it difficult to ground; this raises thorny questions of safety for both men and machines.

The second day's sessions concentrated on process control systems. Outstanding among the five important papers was one on closed circuit television by Rudolph C. Renko of Diamond Power Specialties Corp. and one on the gamma ray gauge to monitor kiln feed slurry by Jack Allen, chief electrical engineer of St. Lawrence Cement Co.

Heavy advance registration encouraged the committee to schedule a second conference. This was announced for May 17 to 19, 1960, at the Pfister Hotel in Milwaukee. Mr. V. G. Murdock of Allis-Chalmers Manufacturing Co. will be the chairman.

American Cement Corp. buys new deposits

GARNER A. BECKETT, chairman of the board, American Cement Corp., announced the purchase of more than 1,500 acres of land in Amador County, Calif. The acquisitions consist of large limestone deposits near Volcano plus clay deposits and alternate plant sites near Ione.

Riverside Cement Co., one of the divisions of American Cement, has plants in southern California serving that area and parts of Arizona and Nevada. *(Continued on page 49)*

B.F.Goodrich

B.F.Goodrich tires help contractor speed rugged construction of Glen Canyon Dam

MIGHTY Glen Canyon Dam—world's third highest—will tower 700 feet above the bedrock of the Colorado River in northcentral Arizona. Before this massive project can be completed, millions of tons of rock, sandstone, aggregate and other materials must be moved over rocky haul roads.

To help keep this rugged job on schedule, Merritt-Chapman & Scott Corporation, general contractor, relies on B.F.Goodrich tires and service—uses 47 different types and sizes of tires on 23 different types of equipment that work 'round the clock. For example, M-C&S uses B.F.Goodrich Rock Service tires on belly dump trucks (above).

B.F.Goodrich builds the Rock Service for just this kind of work. Husky double-chevron cleats pull in forward or reverse, defy rock cuts and bruises. B.F.Goodrich FLEX-RITE NYLON cords withstand double the impact of ordinary cord materials, resist heat blowouts and flex breaks. Result: This B.F.Goodrich cord body outwears even the extra-thick tread, can be retreaded over and over.

Other B.F.Goodrich products at work at Glen Canyon include conveyor belting, air hose and fire hose. Special maintenance and service for tires and industrial products are also in operation—all part of the new B.F.Goodrich Unified Contractor Program. No matter what your off-the-road job, B.F.Goodrich is ready to serve you—and help you save. Your Smileage dealer is listed under Tires in the Yellow Pages of your phone book. *The B.F.Goodrich Co., Akron 18, Ohio.*

Specify B.F.Goodrich Tubeless or tube-type tires when ordering new equipment

Smileage!

B.F.Goodrich *off-the-road tires*

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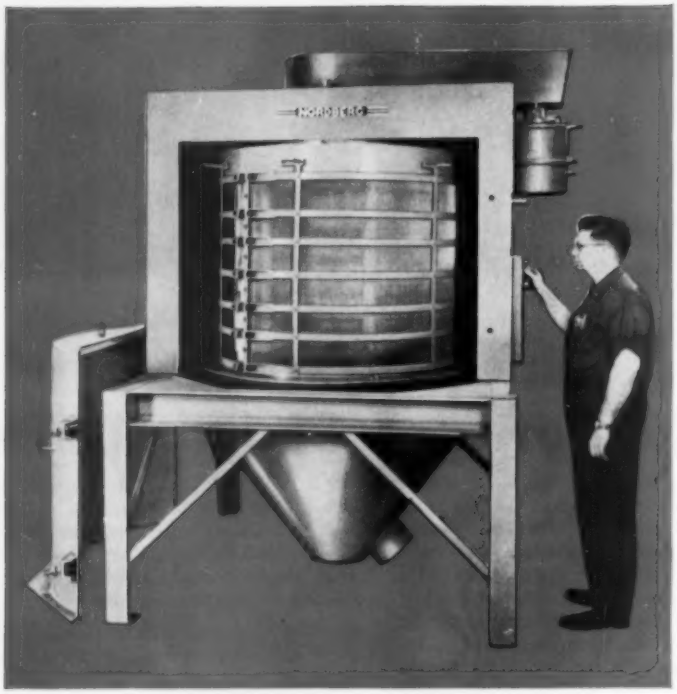
the greatest innovation in screening in 25 years!



The Symons V-Screen, most modern screen on the market for fine sizing, is really the first innovation in screening principles in about a quarter century. It is the only screen on the market that uses the added action of centrifugal force to accomplish fine screening. All other vibrating screens depend upon gravity alone.

In many limestone operations, the Symons V-Screen has proved its ability to do fine screening which had previously been considered impractical or impossible because of damp feed, fine dust adhering to larger pieces, and other common problems. The V-Screen actually outperformed screens which used heated decks and other expensive gadgetry to eliminate blinding.

The growing necessity to increase efficiency and up-grade product for better profit has placed new standards upon screening equipment. Today's increasingly rigid specifications can be met, efficiently, only with modern screens. Let us show you what Symons V-Screens can do to give you better, more profitable fine screening.

Write for Bulletin 243

OUTSTANDING FEATURES

- **The only vibrating screen that does not depend on gravity alone to size material.**
- **Finer separations than with conventional screens ... as fine as 80 mesh in some cases.**
- **Makes premium products of clean chips and ag-lime from waste piles of limestone.**

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SYMONS ... a registered Nordberg trademark known throughout the world.

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INDUSTRY NEWS

(Continued from page 46)

Credit should be given . . .

TO AMERICAN BLOWER CO. for supplying the kiln fans and kiln dust collectors at Chemical Lime Co. We regret that the equipment reference on page 145 of the February issue did not list these two items correctly.

Small error, big difference

EVEN THE ADDITION of the small letter "a" makes a lot of difference. We regret that the name of McDowell Company Inc. was misspelled in the equipment list on p. 86 of the April issue of ROCK PRODUCTS. Correct listing of the weighing belt feeders in Lehigh's raw milling department should have been, ". . ABCs Scale Division, McDowell Company, Inc."

New, modernized cement plants in the news

HAWAIIAN CEMENT CORP. plans to build a $12 million plant in Honolulu, to be completed in 1961. The one-million-bbl. annual capacity plant will be the second company in the islands, the first being the operations of industrialist Henry J. Kaiser.

Hawaiian Cement president Robert D. Fisher told a news conference that construction would begin in August. Stockholders in the recently organized corporation are American Cement Co. and Cyprus Mines Corp., mainland firms, plus Alexander & Baldwin, the Dillingham Estate, Gaspro Co. and the Hawaiian Dredging and Construction Co., all of Honolulu.

A $1½ million expansion at Portland Cement Co. of Utah is set for completion by year's end. Boosting annual capacity from 400,000 to a million bbl., the new equipment includes quality-control apparatus and a 300-ft. kiln.

Ideal is building a $1.7-million cement distribution terminal at Vancouver, Wash., on the Columbia River opposite Portland, Ore. Planned to receive cement by ship or barge, the terminal includes silos, a bagging house and facilities for shipping both bulk and bagged cement by car and truck.

Medusa is also planning a new packing house. The $500,000 project will give the firm's new Wampum, Pa., plant modern shipping facilities; it is on the site of the old plant there, which was demolished.

(Continued on page 52)

IT TOOK A 17 TON PULL TO BREAK THIS FLEXCO®

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MORE THAN 3 TIMES THE STRESS PLACED ON MOST OPERATIONAL BELTS!

Tests such as this, using belts of various sizes and construction, are part of Flexible's continual effort to improve fastener design and performance.

FLEXCO—THE PREFERRED FASTENER BY BELT MAINTENANCE CREWS! Holding power . . . ease of application . . . wearability—thoroughly tested before they ever reach the user.

QUALITY FEATURES OF THE FLEXCO DESIGN . . .

Plates have special cupped ends on top and bottom . . . distribute the strain over entire plate area.

Teeth are spaced for best holding action.

Precision-made bolts and nuts.

FOR SPLICING, and REPAIRING RIPS and TEARS . . . ON NEW and WORN BELTS!

(Full details on this Test available on request)

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"FOR THE SPLICE OF A LIFETIME"

Flexible STEEL LACING COMPANY

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"Our Ford F-800's, pulling 20-ton payloads, give us mighty good service!"

says R. Dillard Teer, Vice President
Nello L. Teer Co., Durham, N. Carolina

"We operate about 115 Ford Trucks ranging in size from ½-ton pickups to Tilt Cab Tandem tractors. We believe in carefully fitting the truck to the job to be done and usually stay within the manufacturer's recommended ratings. We make an exception to this rule with our Ford F-800's, pulling 20-ton loads in aluminum trailer dumps to our quarry and crushing setup at Durham, North Carolina. These units are carrying the maximum legal limit and give us mighty good service!

"We haven't traded any trucks in about 6 years. It just happens that our company has been growing so rapidly that when we buy a new truck, usually an F-800, I put it under one of our trailer dumps. Then I'll take the old truck, lengthen the chassis, and make a grease outfit or a water wagon out of it. I would say out of over a hundred Ford units in the past 7 or 8 years, we have gotten rid of only a dozen altogether—and some of these were wrecked or burned.

"Another reason we use Fords is that this business is rough on trucks, so parts availability is very important. Our experience over the years with Ford as compared to Ford competitors has been definitely in favor of Ford on parts."

NOW! CERTIFIED PROOF!

FORD TRUCKS COST LESS

'59 Ford Pickups beat average mileage of other leading makes by 25.2% in Economy Showdown U.S.A.

Here at last is certified proof of the differences in gas mileage between six-cylinder pickups . . . evidence that you can use in your operation.

It was compiled by America's foremost independent automotive research firm after testing 1959 six-cylinder, ½-ton pickups of the six leading makes. All trucks were bought from dealers—just as you would.

The tests paralleled every kind of driving – high speeds and low, open highways and city traffic, even door-to-door delivery. And in every test, '59 Ford Sixes delivered more miles per gallon than any other make. Here are the actual percentages:

'59 FORD PICKUP SIXES GAVE

42.6% better mileage than make "D"
31.1% better mileage than make "I"
25.2% better mileage than make "C"
22.0% better mileage than make "S"
9.6% better mileage than make "G"

Taken together, Ford got 25.2% more miles per gallon than the average of all other leading pickups!

What's the secret of Ford's economy? First, of all pickup sixes, only the Ford Six has modern Short Stroke design which reduces friction and requires less fuel. Second, to this modern engine, Ford has added a new economy carburetor to meter fuel more precisely in both high- and low-speed ranges.

See your Ford Dealer for the full report of Economy Showdown U.S.A. and get the whole story firsthand.

All tests conducted and results **CERTIFIED** by America's foremost independent automotive research organization*

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INDUSTRY NEWS

(Continued from page 49)

New Permanente plant going up in Hawaii

PERMANENTE CEMENT CO. plans to complete a 1.7 million bbl. plant in Hawaii late next year, making the firm first to erect a manufacturing plant there. The installation will be near Oahu's Waianae, where the firm has a large deposit of raw materials. Design of the dust-free plant is reported to be well along. A new firm, Hawaiian Cement Corp., plans to complete a one-million-barrel plant in Honolulu in 1961.

Lightweight concrete use reported gaining rapidly

USE OF LIGHTWEIGHT structural concrete in the Northeastern U. S. will more than double soon, the Expanded Clay and Shale Association reports. A survey of architects and engineers there showed that the lighter concrete is rapidly gaining acceptance for multi-story apartment structures. For instance, two projects are planned requiring 40,000 cu. yd., plus several more taking 20,000 cu. yd. each.

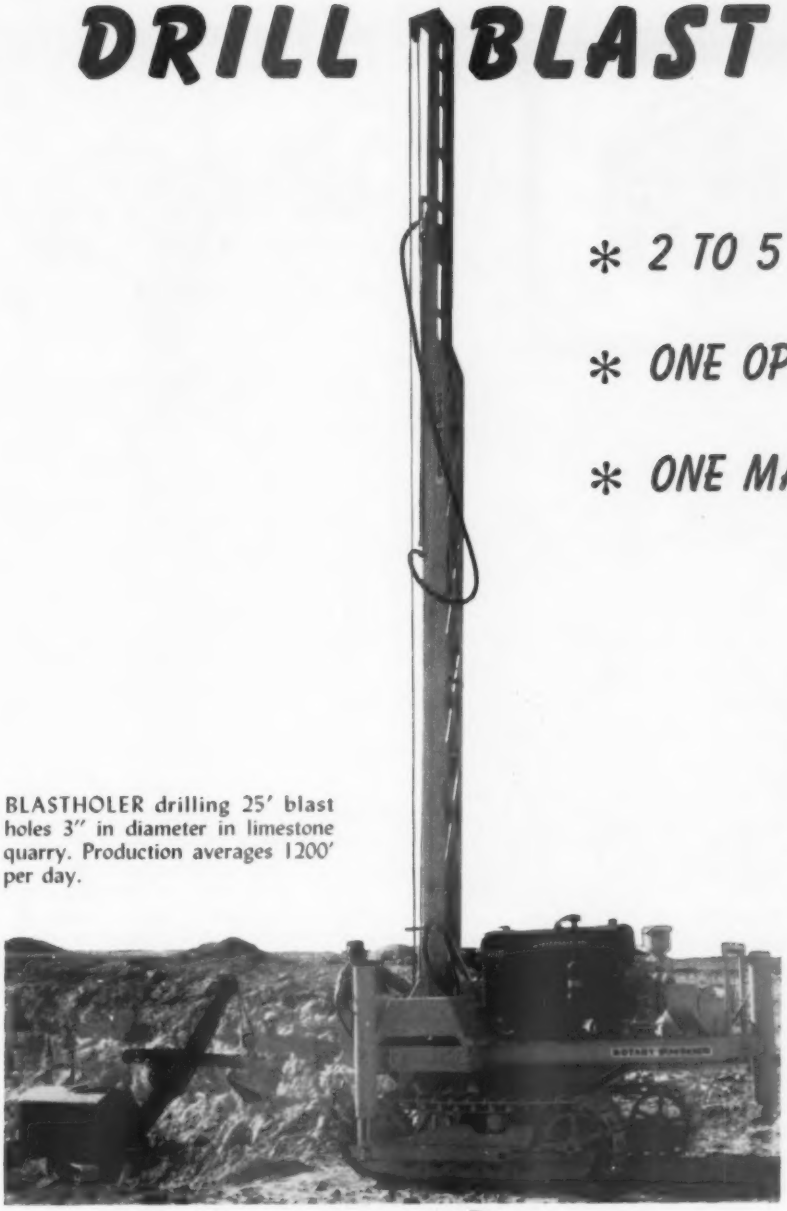
ASTM issues reports on bituminous materials

THE AMERICAN SOCIETY FOR TESTING MATERIALS has issued two new reports on bituminous materials. The first is "Compilation of ASTM Standards on Bituminous Materials for Highway Construction, Waterproofing and Roofing." Among the specifications and test methods given are 31 new ones developed since the ASTM last published the book in 1957. One new standard is "Resistance to Deformation and Cohesion of Bituminous Mixtures by Means of the Hveem Apparatus." The 488 page book sells for $4.75.

The second publication is "Effect of Water on Bituminous Paving Mixtures." "Highway engineers are painfully aware of the effect (of rainfall on) an otherwise perfectly designed (asphalt) pavement," the announcement of the book notes. Purpose of the book is to describe the stripping action of water on bituminous pavements. The 102-page publication sells for $2.75. Both books can be ordered from the Society, 1916 Race St., Philadelphia 3, Pa. *(Continued on page 54)*

DRILL BLAST HOLES

* 2 TO 5 TIMES FASTER
* ONE OPERATOR
* ONE MACHINE



BLASTHOLER drilling 25′ blast holes 3″ in diameter in limestone quarry. Production averages 1200′ per day.

BLASTHOLER

A self-propelled rotary drill, the BLASTHOLER is mounted on tracks or dual pneumatic tires — covers terrain like a bulldozer. The BLASTHOLER requires only one operator — carries its own air for cleaning blast hole. In limestone quarries meeting highway specifications, the average time for 20′ holes is 3 to 4 minutes. Many BLASTHOLERS have drilled more than a million feet within a 2-year period. Chances are the BLASTHOLER can improve your production record and save you money, too! *Contact your nearest dealer for a cost-cutting demonstration today!*

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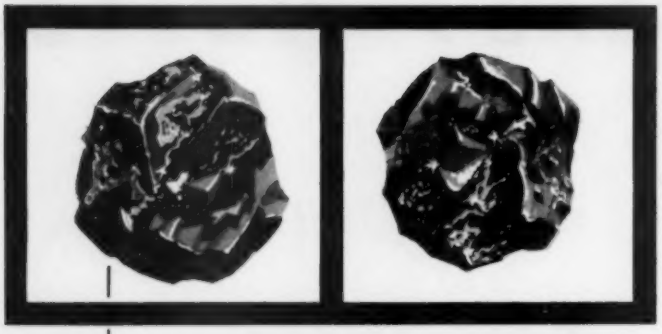


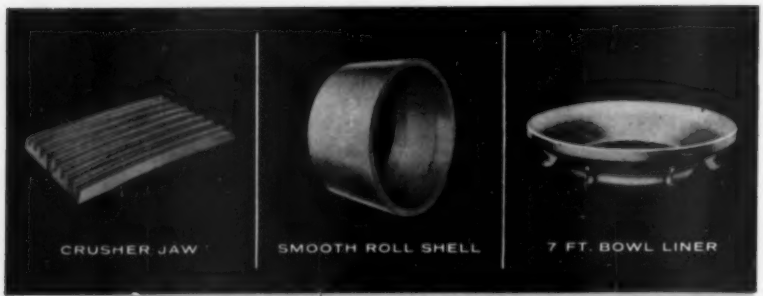
which is gold?
which is fool's gold?

You don't have to be a fool to be fooled by fool's gold. Nor do you have to be a fool to be fooled by crusher replacement parts.

In outward appearance crusher parts from different manufacturers often seem to be of equal value. Yet, the product of one manufacturer will outwear its competition by a substantial margin. That's why Columbia invites you to COMPARE Armor-Tough Manganese Steel replacement parts with those you are now using.

Compare! Order Columbia Armor-Tough crusher parts. Submit them to the "acid test" of job performance. You, too, will agree that Columbia crusher parts are the "real gold" of the industry.

Send for the new illustrated Columbia Bulletin No. 1063, featuring crusher, tractor, shovel, bucket replacement parts.



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INDUSTRY NEWS

(Continued from page 52)

South Dakota's cement profits increase

PRODUCTION OF THE South Dakota cement plant in Rapid City declined in the last biennium, but profits were higher. Financial aspects of the cement plant operation were contained in the 17th biennial report forwarded to Governor Joe Foss by the South Dakota Cement Commission. The report covered the period between July 1, 1956, and June 30, 1958.

Gross cement plant sales from July 1, 1956, until June 30, 1958, were $12,542,620.68. For the comparable two-year period before that, they were $12,631,282.44. Gross profit from sales for the last biennium was $5,225,718.19, which resulted in a net profit of $4,906,415.92 when selling and administrative expenses were deducted. The 1954-56 gross profit totaled $4,840,131.12, which was reduced to a net of $4,568,100.70.

Cement firms report outstanding quarter

AMID FIRST-QUARTER REPORTS which could be described as nothing but rosy, the nation's cement makers predicted a prosperous 1959. For example, Marquette reported new orders up 18½ percent for the period over last year. Ideal president Chris Dobbins said sales should be very good at least through the third quarter; his firm's sales were up 37 percent for the quarter, over last year.

Other quarterly reports showed: General up 36 percent in sales from 1958, Marquette up 23 percent, Consolidated up 42 percent, Penn-Dixie up 25 percent, Keystone up 32 percent and Missouri Portland up 46 percent. Only two quarterly reports reaching ROCK PRODUCTS showed lower 1959 sales: Medusa was down 5 percent from the first quarter, 1958, and Glens Falls sales dropped 7 percent. Both noted that adverse weather conditions hurt sales.

About the only serious cloud on the 1959 horizon was the price freeze to which most producers have agreed for the year. Because capacity is now plentiful, they've agreed not to raise prices to their customers, in return for contracts for the full year. But many expect that profits will not rise as much as sales this year, because a boost in wages at midyear may raise costs considerably. (Continued on page 56)

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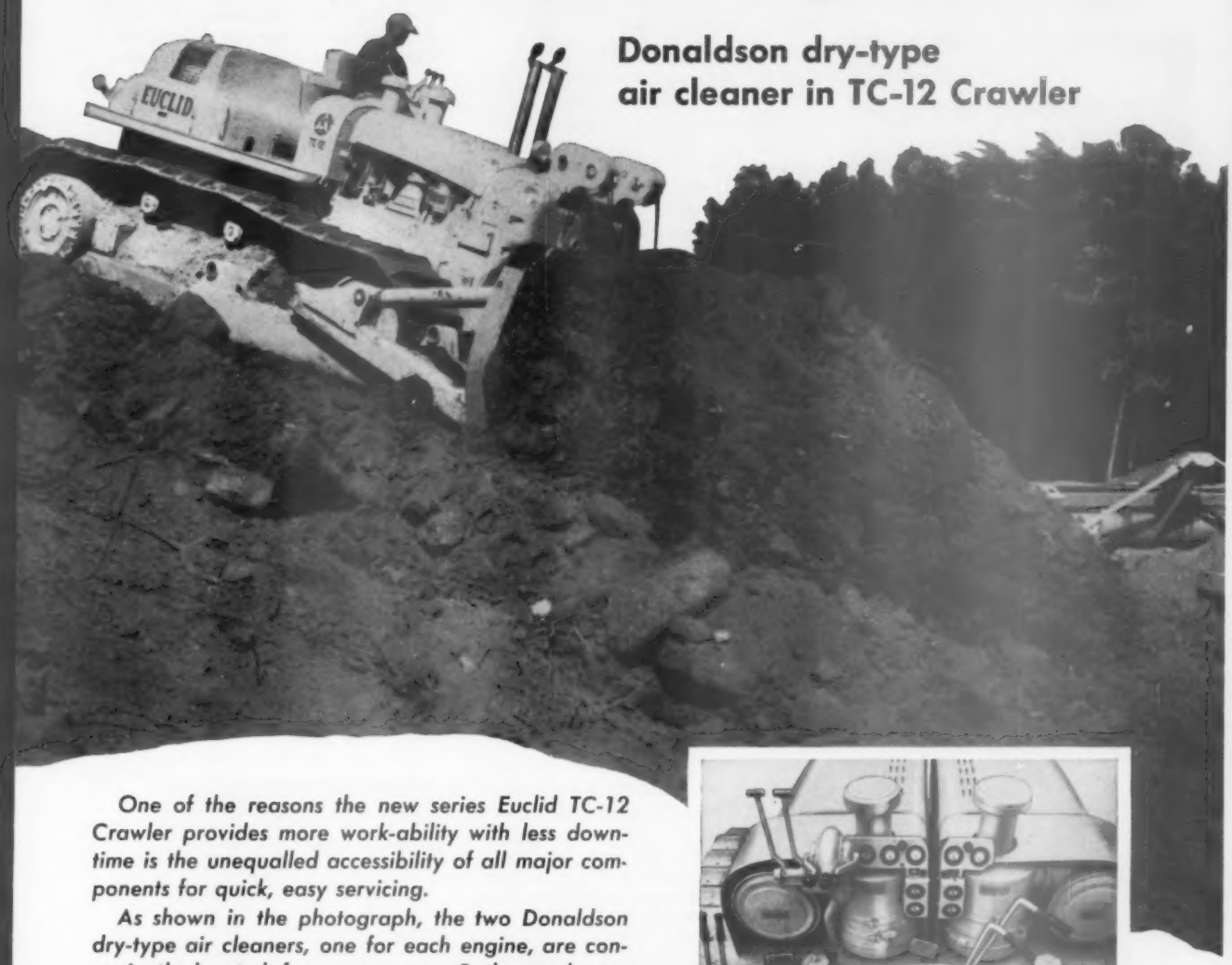
Another EUCLID product improvement!

Donaldson dry-type air cleaner in TC-12 Crawler

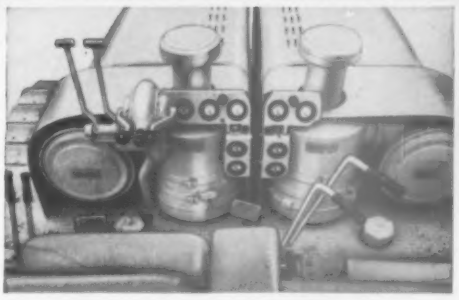


One of the reasons the new series Euclid TC-12 Crawler provides more work-ability with less down-time is the unequalled accessibility of all major components for quick, easy servicing.

As shown in the photograph, the two Donaldson dry-type air cleaners, one for each engine, are conveniently located for easy access. Both pre-cleaner and secondary filter can be serviced in a fraction of the time required for oil bath cleaners and there's no mess—just empty the pre-cleaner dust cup, clean and replace a paper element in the secondary cleaner.

HIGH EFFICIENCY CLEANER INCREASES ENGINE LIFE

The Euclid TC-12 Crawler is now being built with the Donaclone dry-type air cleaner as standard equipment. This 99.9% efficient cleaner reduces engine wear caused by dust—increases the service life of the engine and helps maintain top operating efficiency. Engine manufacturers say that 8 ounces of



abrasive dust can ruin an engine in a short time. Because of the tremendous volume of air that passes through an engine in a single shift, the importance of air cleaner efficiency is obvious. That's why Euclid uses this Donaldson cleaner on the new series TC-12 . . . it's another example of constant product improvement that makes Euclid your best investment.

EUCLID Division of General Motors, Cleveland 17, Ohio

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

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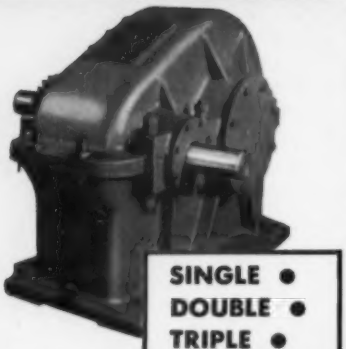

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Proven On-the-Job Advantages of This Type of Gear Reduction

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We have extensive facilities for making Herringbone Gears, producing them from 1" to 60" in diameter, 16 DP to 1½ DP and up to a 20" face.

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INDUSTRY NEWS

(Continued from page 54)

Lime stabilization: road-building boom

LIME STABILIZATION of roads, runways and parking lots gained by 53 percent last year to about 20 million sq. yd., the National Lime Association reports. This is equivalent to 1,435 miles of 24-ft. wide road; about 240,000 tons of lime were used. Between ½ and 6 percent lime is used in soil stabilization.

The largest, and perhaps the most dramatic single job using lime subbase stabilization was at Bergstrom air force base, Austin, Tex. About 13,000 tons of lime were used to stabilize 1¼ million sq. yd. of subgrade. Results were dramatic because extraordinary rains in Texas recently (50 in. last year) made the clay subgrade unusable without reworking after each heavy rain. The MC-3 bituminous seal over the compacted subgrade clay would crack in hot, dry spells, letting water from subsequent rains reach the clay. But lime-stabilized subbase was largely waterproof, drying in only a day or two. The American Road Builders' Association has issued a valuable booklet, Bulletin 239, describing the success of lime stabilization at Bergstrom. Single copies are available free to members, and at a cost of 50 cents to nonmembers, from the Association, World Center Building, Washington 6, D.C.

Ideal stockholders ratify stock split

IDEAL CEMENT CO. stockholders ratified the 3-for-1 split in the shares of the company's capital stock previously authorized by the board of directors. More than 88 percent of the stock was represented at the special stockholders' meeting.

The authorized capital stock could then be increased from 4 million shares of $10 par value to 12 million shares of $5 par value. Two additional shares were issued January 30 for each share held of record at the close of business January 26.

Previously there were 3,513,615 shares outstanding. These were automatically changed to $5 par. Additional shares numbering 7,027,230 were issued, making 10,540,845 outstanding in all.

Long-distance pipelines for solids forseen

LOW LABOR COSTS and no "dead heading" are two reasons why pumping of solids through pipelines may gain rapidly as a method of long-distance shipping. This was the opinion given a joint session of the pipeline and power divisions of the American Society of Civil Engineers in Cleveland recently by Julian Nardi, chief mechanical engineer of Ford, Bacon & Davis, Inc., New York City, engineers and management consultants.

Transporting limestone, sand, ore, lignite and coal as slurries for distances of from 30 to 600 miles by pipeline poses technical difficulties, but they can be solved, Mr. Nardi believes. Chemical additives minimize corrosion and erosion, keep the solids in suspension while in transit, separate the solids from the water at the terminal and clean or purify the effluent water, he said.

He noted that a pipeline is more economical than railroads or trucks only when large quantities, many years of useful life, high annual loads and relatively long distances are involved. "As railroad tariffs continue to increase, more and more such solids will be pumped overland, especially where water transportation is not available, and where a slurry or fine sizes of the solids are desirable," he said.

Bank of pumps in narrow chamber 800 ft. down at Bonanza lift Gilsonite slurry to the surface

The successful transporting of 700 tpd. of gilsonite 72 miles over the Book Cliff Mountains from Bonanza, Utah, to Grand Junction, Colo., was reported in March, 1958, ROCK PRODUCTS. The cost was reported to be $1 per dry ton for the pipeline, and $5 a ton for trucking.

(Continued on page 60)

THE BIG E

EIMCO TRACTOR-LOADER

Either Overhead Eimco 105 or FEL – Eimco 125

— provides the most economical means of digging and loading rock

Eimcos are massive, heavy-duty, big bucket crawler loaders with job proven, exclusive features which insure high capacity, low maintenance and dependability.

If you want to keep your capital outlay down or have the edge in competitive bidding, call for an Eimco sales engineer to give you full details.

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engine power
BY CATERPILLAR

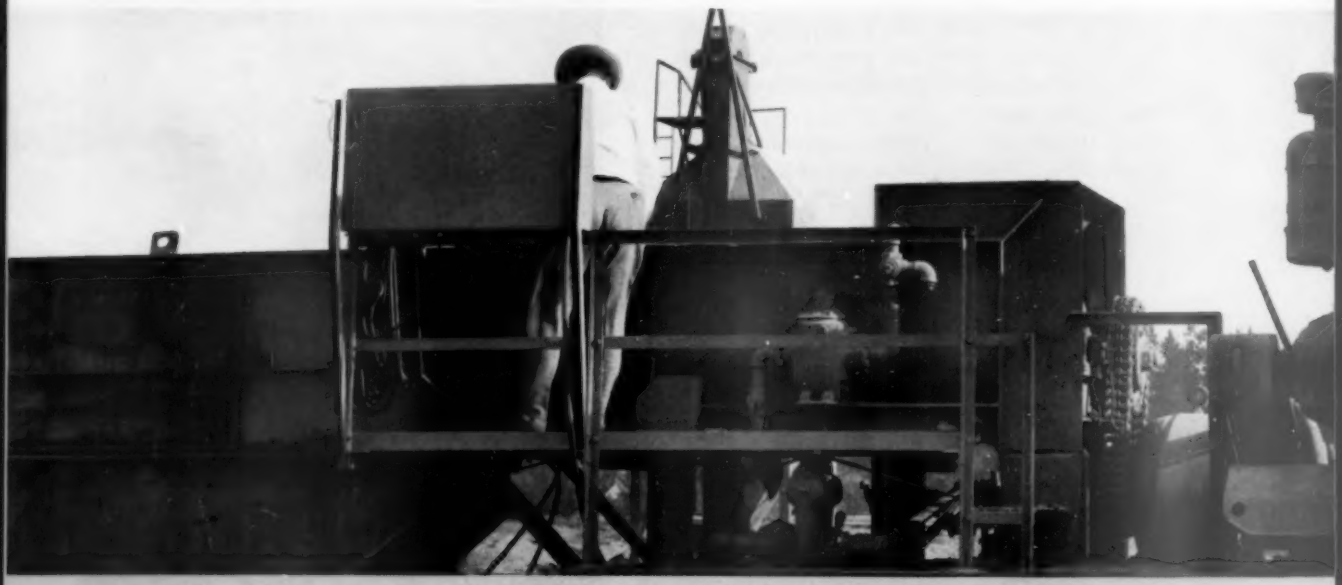
CAT "TWO-HANDED" OF BASE

. . . supplies *portable* power for *both* mechanical and electrical equipment

In Wyoming, where a lot of base stabilization must be done in highway construction, Wyoming Paving Company was awarded a late season paving contract where maximum plant production was a must.

Wyoming Paving Company solved their power problem—and their production problem too—with a Cat D337 Series F "Two-Handed" Engine. This Cat unit provides direct mechanical drive, through a clutch, on one end of the diesel engine shaft. Simultaneously, an electrical generator on the other end is capable of handling up to 60 KW of 240-volt, 60-cycle, 3-phase electrical load. Total rated output of the unit is 230 BHP.

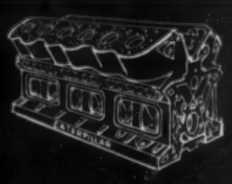
With this ample power, Wyoming Paving Company has been able to double the manufacturer's minimum plant production and produce 550 tons of material an hour—occasionally as much as 600 tons. The compact Caterpillar unit has helped them speed construction of an important section of Interstate Highway 25 in Wyoming —and it gives them convenient, portable power for their



Caterpillar's own foundry casts engine blocks of a special high-tensile-strength alloy, 50% stronger than ordinary gray iron castings. Further rigidity and strength are provided by numerous ribs and partitions.

Cat Generators have outstanding heavy motor starting ability, are simple and compact with no moving parts in the voltage control system. Output terminals are conveniently located for connection to panel or load. Generators are *matched* to engines.

Your Caterpillar Dealer Engine Specialist is your diesel power consultant. He's backed by quality parts reasonably priced, and a skilled staff of factory-trained servicemen. Call him now to avoid problems later.



DES

ENGINE DOUBLES USUAL OUTPUT STABILIZATION PLANT

crusher and hot plant or for lighting when the unit is not needed for base stabilization.

The D337 Series F is just one of *nine* basic Cat Engines. Capacities range from 75 to 700 horsepower. This line of versatile Cat Engines saves space, gives you portable power for every purpose, and saves money where you need both mechanical and electrical power.

Your Caterpillar Dealer Engine Specialist can help you choose the best size and type for diesel power, generator or combination drive applications. He can help you with *any* problem or question you have concerning diesel power. Call him for repowering assistance or for advice in selecting the proper engine for new plants, excavators, dredges, compressors or locomotives.

CATERPILLAR

Engine Division, Caterpillar Tractor Co., Peoria, Ill., U. S. A.

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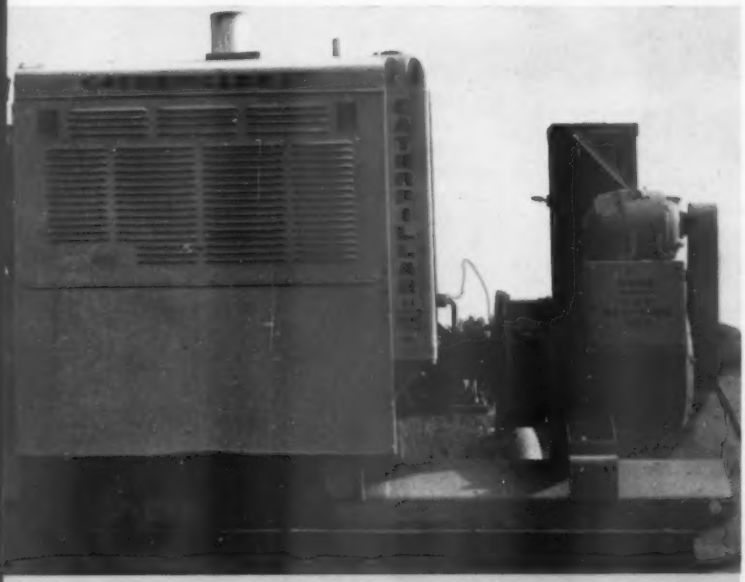
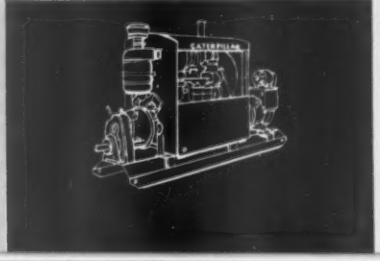
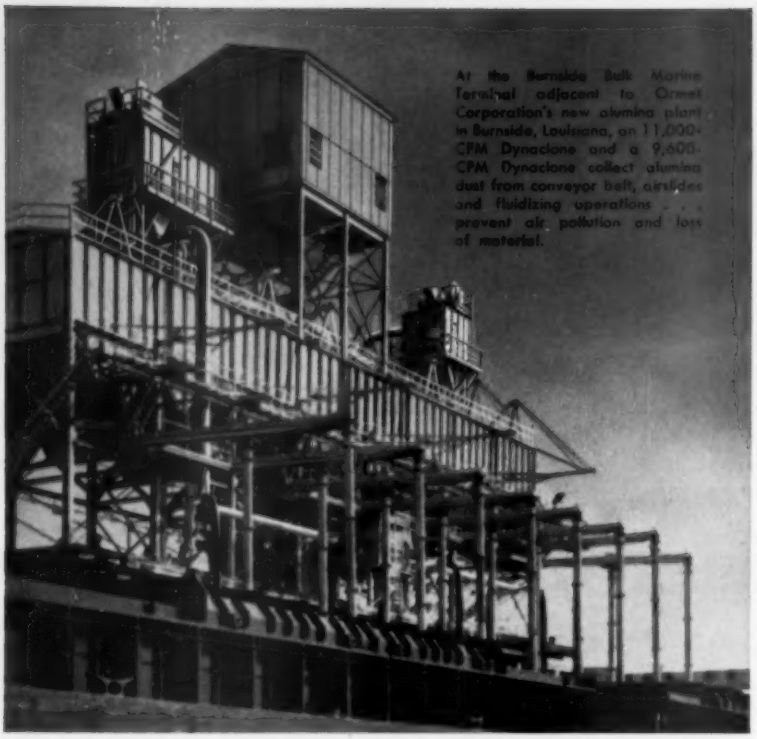


Turbocharging is standard on most Cat Engines, giving more power per engine weight to make possible a much smaller engine package for a given horsepower.

Nine basic Cat two-handed Engines range in size from the 700 HP (maximum output rating) D397 Series D to the 75 HP D311 Series H. These can be matched with generators to meet your exact job requirements.




At the Burnside Bulk Marine Terminal adjacent to Ormet Corporation's new alumina plant in Burnside, Louisiana, an 11,000-CFM Dynaclone and a 9,600-CFM Dynaclone collect alumina dust from conveyor belt, airslides and fluidizing operations . . . prevent air pollution and loss of material.

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The Dust Filter for Continuous Processes

Just turn this dust filter on and forget it. The Dynaclone operates continuously, 24 hours a day. It maintains constant, uniform suction at dust sources, reclaims all the dust to prevent air pollution and damage to plant equipment.

The Dynaclone has *new* "Resist-O-Wear" filter bags (patent pending) that give as much as three times longer bag life . . .

It has a new roller cleaner for simplified automatic self-cleaning. Resilient rubber rolls form a positive dust seal as each row of bags is cleaned by atmospheric air drawn in by the main operating fan.

And it contains more cloth per cubic foot of filter than any other make . . . greater filtering capacity with smaller space requirements.

Learn the many reasons why the Dynaclone represents a new high in dust filter efficiency . . .

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INDUSTRY NEWS

(Continued from page 56)

NALI defends position on ACP and SCS

RECENTLY the National Agricultural Limestone Institute has been criticized for stating that it favors giving more Federal money to the Agricultural Conservation Program rather than to the Soil Conservation Service. The Institute strongly believes that more money for use in conservation gets into farmers' hands with the ACP than with SCS, and so favors the former group.

In a letter to county agents, president Robert Koch of NALI said, "Nationally we spent $24.3 million for ACP administration last year, and $88.1 million for the Soil Conservation Service." He wants to know what farmers received for this extra $60 million for SCS administration.

"Does not the ACP reach more farmers each year than SCS? Does not the ACP bring about more conservation than SCS?" Mr. Koch believes it does, and so is disturbed about the recent cut in total ACP funds from $250 million to $100 million, while SCS funds were not cut. But in a recent statement of policy, NALI says it is "not opposed to the basic principles" of the SCS, and "stands ready at all times to fully cooperate with every agency in this area of service to farmers. However, the National Agricultural Limestone Institute is opposed to any person or group criticizing the Agricultural Conservation Program in order to benefit their own interest."

Brazil cement firm gets $1.2 million loan

ROBERT L. GARNER, president of the International Finance Corp., announced that the corporation has agreed to invest a total of $1.2 billion in Companhia Mineira de Cimento Portland S. A. (COMINCI), a Brazilian corporation. COMINCI will construct and operate a new cement plant with a capacity of about 200,000 metric tons a year at Matosinhos, Minas Gerais. The company was formed several years ago by private Brazilian investors who contributed some valuable limestone deposits.

The company recently secured the benefit of engineering and management agreements with the Lafarge cement company of France, which proposes also to make an investment in the share capital. *(Continued on page 65)*

"Our Universal Wobbler Feeder SMOOTHED OUT DISCHARGE FLOW OF WET LIMESTONE - REDUCED AUXILIARY EQUIPMENT MAINTENANCE"

Says Maule Industries, Inc., Miami, Florida

"Maintenance on auxiliary equipment has been reduced because the Wobbler Feeder smoothed out the discharge flow, minimized the tendency of wet material to 'surge' onto conveyors."

Maule Industries supplies concrete and concrete products to building and road contractors. They have a total of 21 plants and warehouses throughout eastern Florida.

"At our Prospect Quarry near Fort Lauderdale, we're working with Oolitic limestone which has a moisture content from 5 to 20%. Before installing a Wobbler Feeder, material was fed by a vibrating grizzly feeder. This was unsatisfactory because the grizzly permitted the relatively moist rock to 'surge' from feeder to roll crusher to conveyor belt." According to Maule Industries, Inc., this 'gushing' of material and water created an abnormal cleanup problem around the equipment and the production level was substantially affected.

"The Wobbler Feeder really proved it could handle this wet material. After its installation our production level was increased by as much as 65 tons per hour. The Wobbler supplies an even flow of rock to the roll crusher with a highly efficient separation of fines.

"In fact, the Wobbler was so effective we installed another one at our Red Road Quarry in combination with a Universal Impact Master."

How Universal's Wobbler Feeder Works — The Universal Wobbler Feeder feeds and scalps in one operation. Elliptical-shaped bars form the bed of a hopper and are set in alternate vertical and horizontal positions. Turning of the bars imparts a rocking, tumbling forward motion to the load. Fines drop through spacing between bars. Oversize is delivered off the end. Unlike a screen, the Wobbler does not vibrate — nor will it clog in wet sticky material.

What the Universal Wobbler Feeder has done toward lowering maintenance costs and increasing capacity for others it can do for you. Tell us the kind of material to be handled, the percentage of fines in the feed, size of fines to be removed and the desired capacity in tons per hour. We'll furnish complete information.

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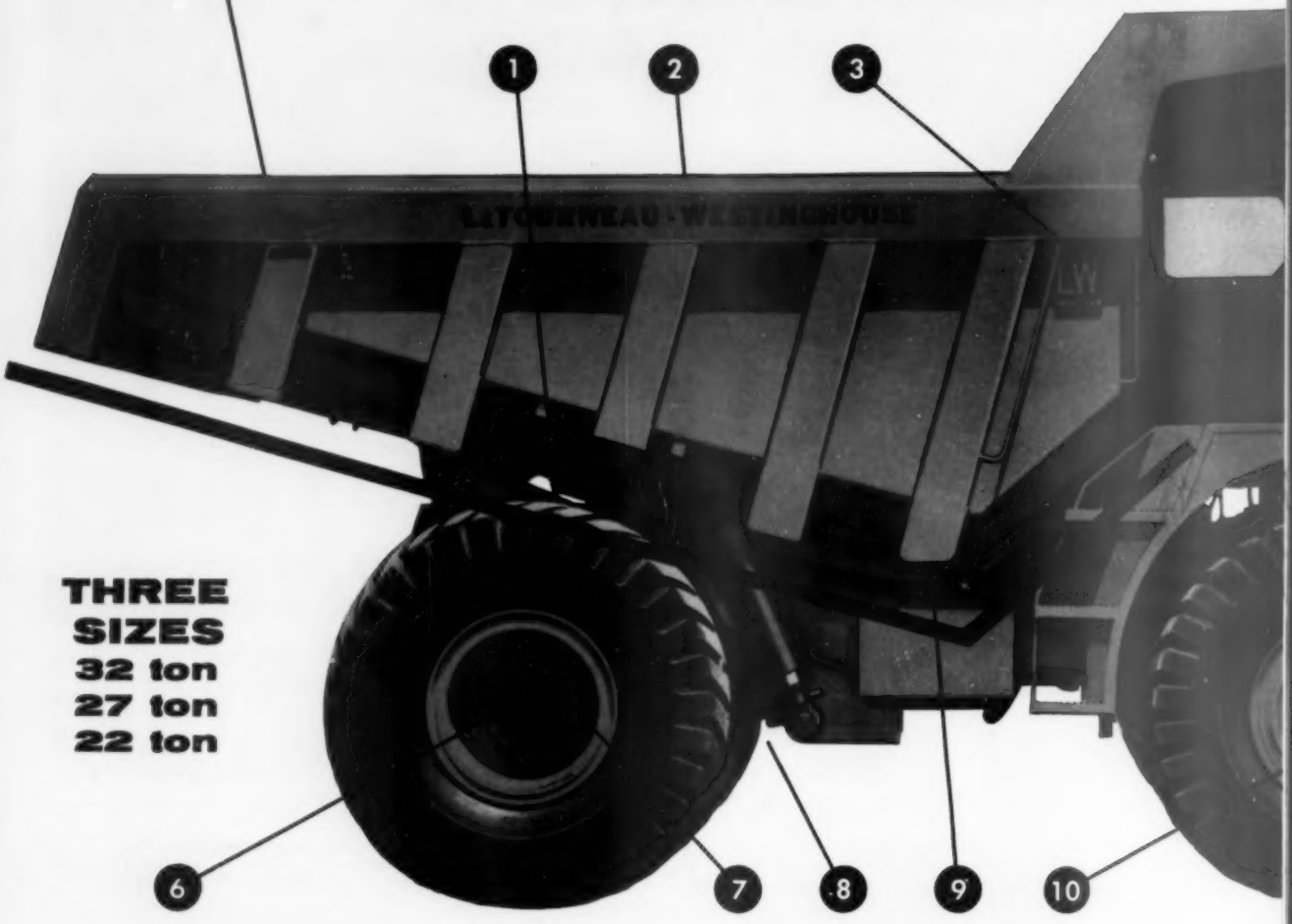
LW PARADE OF PROGRESS

the first all-new off-road truck in a quarter-century . .



THREE SIZES
32 ton
27 ton
22 ton

Look at these important advanced Haulpak features!

1. "V"-shaped body — gives you bonus yardage within a short wheelbase. Loaded material quickly fills all corners for big low-void pay loads. "V" also provides a low center of gravity . . . gives Haulpak the stability needed for high-speed hauling over rough roads and steep grades.

2. Low loading height — (only 10'1" on the 32-ton size) and large top opening (14'5" x 11') — makes it easy for shovel operators to load Haulpak fast, without spillage.

3. Big, roomy cab — with canted windshield has many work-efficiency features.

4. Strong, protective canopy — covers cab completely.

5. Positive power steer — and sure-grip, auto-size steering wheel — for safe, easy handling. Steering system is located high behind bumper, well protected from damage.

6. Exclusive power-transfer differential — automatically transfers power to wheel on firmest footing for maximum traction. This same, patented LW differential has boosted production and profits for thousands of LW Tournapull® owners for more than 14 years . . . and now, *for the first time*, it is available on a truck.

7. Needs NO daily maintenance — Haulpak's bearings never need lubrication . . . they're moly-coated to resist abrasion, packed in grease, and sealed for life. The entire Haulpak lubrication check — *needed only at 500-hour intervals* — consists of just 4 easily-reached grease fittings.

8. Has no springs, rides on Hydrair* — Haulpak's exclusive air-hydraulic suspension system completely eliminates maintenance and repair of springs. 4 Hydrair units cushion against loading and travel shocks. System compensates *automatically* for off-center loading and keeps unit riding level over humps and holes.

9. 100% rubber-mounted body — cushions loading shocks. Engine, transmission, radiator, and cab are also rubber-mounted to minimize vibration.

10. Four separate braking systems — two controlled by hand levers, two by floor pedal — for fast, safe, sure stops. System includes Torqmatic brake in the Haulpak transmission and big, disc-type air brakes on all wheels having 4 times the braking surface of conventional trucks.

11. "Power-Miser" fan — standard on all Haulpaks, requires only 10 hp to operate, compared with the 30 to 35 hp needed for conventional fans. Thermostatically controlled, fan shuts off *automatically* when engine heat falls below efficient operating temperature . . . permits engine to maintain correct temperature, releases more horsepower for tractive effort.

180° turn in area only 44½' wide — with a wheelbase of only 130", Haulpak turns in far less space than units of similar capacity. This unusual maneuverability permits Haulpak to spot, swing around, back up, and dump without lost motion to delay hauling cycles.

Haulpak®

Hauls more tons per man-hour!

This LW Haulpak is all new from the wheels up. It is the result of more than 3 years of research and development by LeTourneau-Westinghouse engineers — pioneers of a long list of earthmoving and hauling equipment. Although brand new, Haulpak is a fully-proven truck. All three models have been put through rugged tests under the toughest working conditions for over 14 months — in mines, quarries, and on construction jobs. Its various parts and assemblies — some of them tested and proved by *millions of hours* on LW Tournapulls all over the world — are much stronger than those on ordinary haulers. With the all-new LW Haulpak truck you can be confident your truck maintenance, repair, and operating costs will drop to a new low . . . and your hauling tonnage will climb to new highs!

Check the job-tested Haulpak features listed here. Then visit your nearby LeTourneau-Westinghouse Distributor . . . let him give you detailed specifications on the new Haulpaks. Call on him soon!

*Trademark HP-2099-G-2

LW Parade of Progress continues:

The new Haulpak truck is the latest addition to an impressive line of new and improved earthmoving and hauling machines being unveiled by LeTourneau-Westinghouse Company. They're part of LW's continuing program of product development to give you highest production equipment at lowest ownership-operating cost.

LW

LETOURNEAU-WESTINGHOUSE COMPANY

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

SIMPLICITY

GRIZZLY FEEDER

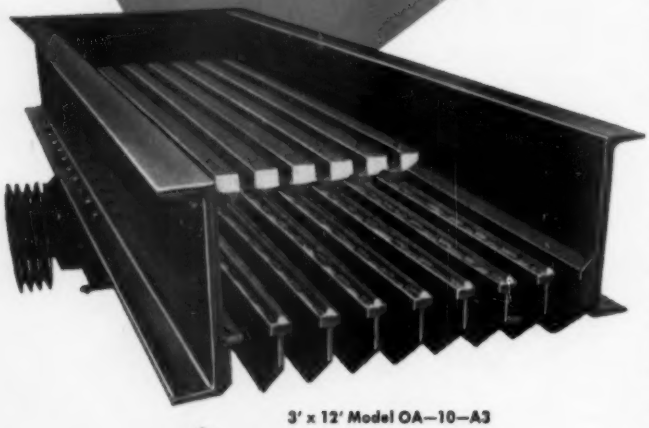
eliminates need of apron feeder and scalper . . .

3' x 10' Model OA—10—A3

Rock can't jam . . . hourly operating costs lowered

The unique design of the Simplicity Grizzly Feeder, which combines feeding and scalping in one operation, eliminates rock jams thus assuring positive uniform flow of material into the crusher.

One operator of a Simplicity Grizzly Feeder says: "... we have used the heaviest type of apron feeders for years and have found it necessary to shut down at least 2 or 3 times a year to hard surface the flights, inasmuch as our material is so abrasive ... we installed a Simplicity (Grizzly) Feeder ... with 1/4" pan and 3/16" liner ... and are glad to report that, AFTER 9 MONTHS OF CONTINUOUS OPERATION, THE FEEDER PAN SHOWS PRACTICALLY NO WEAR WHATSOEVER, and is operating around the clock doing an excellent job of feeding at all times ..."



3' x 12' Model OA—10—A3

The Grizzly Feeder costs less than 50% of the combined apron feeder and scalper ... weighs considerably less ... makes a more compact plant ... and reduces loading height by several feet. While these factors show up so prominently in portable plant production, they are just as effective in a permanent plant installation for the crushed stone, sand and gravel and mining industries.

214

Send for Catalog #371 for complete information on OS-A-VEYOR and GRIZZLY FEEDERS.

SALES REPRESENTATIVES IN ALL PARTS OF THE U. S. A.
FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario
FOR EXPORT: Brown & Sites, 50 Church Street, New York 7, New York

Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND 13, MICHIGAN

Enter 1229 on Reader Card

INDUSTRY NEWS

(Continued from page 60)

NSGA gathers valuable data on public relations

A LOOSELEAF RING BINDER describing public relations activities that sand and gravel producers will find profitable is being prepared for members of the National Sand and Gravel Association. Designed to take added literature as it becomes available, the binder has data in four categories: General, Zoning, Land Rehabilitation and Performance Guides. Planned by the Association's committee on public relations, the "book provides, for the first time, in one convenient source, a complete guide for establishing a sound public relations program for every NSGA member, large or small," executive secretary Vincent P. Ahearn notes.

Outstanding sections include three papers: "The Zoning Problem and Its Significance to the Sand and Gravel Producer," by V. P. Ahearn, Jr.; "The Growing Problem of Zoning Restrictions," by William E. Hole of American Aggregates Corp.; and "Public Relations and the Zoning Process," by W. I. Thieme, American Aggregates Corp. A digest of zoning decisions is also included.

Newfoundland cement plant gets local ownership

THE CORNER BROOK, Newfoundland, plant of North Star Cement Ltd. has been leased to a group of local industrialists headed by Gilbert A. LaBine of Gunnar Mines. Associated with him are George A. Macnamara of Macnamara Construction, Chelsey A. Pippy, Newfoundland Concrete Products, Kenneth Goodyear of Grand Falls, a road builder, and Arthur R. Lundrigan, Corner Brook.

British crush disused concrete to get aggregate

THE BRITISH FIRM St. Ives Sand and Gravel Co. Ltd. has found the solution to a serious problem—a lack of "hardcore" for roadmaking in its eastern England area. The firm has purchased 15 abandoned World War II airbases, and is breaking and crushing the concrete for use in building the important London-Yorkshire motorway. About 10,000 cu. yd. a week of minus 5-in. concrete are made and sent to the highway project. A two-ton drop ball is used to break the concrete, which ranges up to 18 in. in thickness. *(Continued on page 66)*

UPDATE YOUR PIT OPERATIONS

Move Up Your Profits with the All-New BANTAM C-350

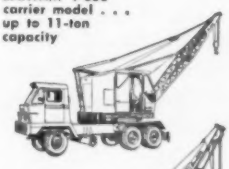
Here's the fast-working crawler that's setting new high production and low operating costs in pit operations. The all-new BANTAM C-350, equipped with shovel as shown, gives highest speed loading. Its extra-fast work cycle—the result of BANTAM's greater power and exclusive quick-action mechanical controls—can boost your stockpiling and loading up to 115 cu. yds. per hour with the ⅝-yd. rehandling dipper. Also available, ⅜-yd. digging and ½-yd. all-purpose buckets. Both are tops for handling blasted materials, bank rock, gravel and shale. And BANTAM's twin-boom design gives you maximum strength and rigidity.

EQUIP YOUR BANTAM AS YOU WANT IT

BANTAM offers the greatest flexibility you've ever seen in the crane-excavator field—choice of standard or long side frames; three types of boom hoists; gas, diesel or LP-gas power; torque converter; two different fairleads; two types of cabs; plus many other options. All these in addition to BANTAM's 11 different quick-change attachments to greatly extend your job range.

YOUR BANTAM DISTRIBUTOR WILL GLADLY GIVE YOU AN ON-THE-JOB DEMONSTRATION

BANTAM T-350 carrier model . . . up to 11-ton capacity



BANTAM CR-350 self-propelled model . . . 11-ton capacity

SCHIELD Bantam Co.

Schield Bantam Co. RP-236
216 Park Street, Waverly, Iowa
Please rush me information on the new BANTAM 350 Series:
☐ carrier mounted BANTAM T-350,
☐ crawler mounted BANTAM C-350,
☐ self-propelled BANTAM CR-350.
Name.....
Title.....
Company.....
Address.....
City.....Zone....State.....

WORLD'S LARGEST PRODUCER OF TRUCK CRANE-EXCAVATORS

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HEADQUARTERS FOR YOUR BEST BUYS IN USED EQUIPMENT!

Your Caterpillar Dealer's lot holds the best selection of used earthmoving equipment buys on the market. Here's why: His business is active—and he reconditions, classifies and guarantees his trade-ins so you *know* what you're getting. Here's how:

1 A **"BONDED BUY"** on used Cat-built equipment is your safest buy. It's a bonded guarantee, up to $10,000 of satisfactory performance on *all* parts during the guarantee period.

2 A **"CERTIFIED BUY"** covers units of any make in good condition. This type of protection carries your dealer's written guarantee of satisfactory performance.

3 A **"BUY AND TRY"** deal is just what its name implies. This protects you with your dealer's written money-back agreement.

Only Caterpillar Dealers offer this protection. You'll find your dealer listed in the Yellow Pages. For your best buys in used equipment, visit his lot today!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

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BEST BUYS IN NEW AND USED EQUIPMENT

Enter 1255 on Reader Card

INDUSTRY NEWS

(Continued from page 65)

Philip Carey asbestos fights four insurgents

FOUR STOCKHOLDERS, with about one percent of the outstanding shares, have asked Philip Carey Mfg. Co. of Cincinnati to boost production at its new $12 million East Broughton, Que., asbestos mine and mill. The four are James J. Harris, Robert D. Hoffman, Lendall P. Warriner and Hewitt S. West, Jr. They claim the firm should raise production from the present rate of 2,200 tons of ore daily, in order to get higher production and "obtain the highest possible return" on the company's investment. The four sought four of the nine seats on Carey's board, hoping to be elected at the March 30 annual meeting.

Management countered by saying that it would not be wise to raise production, because of the present serious overcapacity problem in the industry. Additional production would produce price-cutting and the company would "inevitably lose money," a letter to stockholders reported.

Permanente unit buys two Oregon firms

THE GLACIER SAND & GRAVEL CO. of Seattle, Wash., a subsidiary of Permanente Cement Co., has purchased the Pacific Building Materials Co. and the Readymix Concrete Co. of Portland, Ore. Assets of the two firms include two Portland sand and gravel plants and three ready mixed concrete plants—two in Portland and one in Vancouver, Wash.

The purchase price was in excess of $1.5 million. Two divisions were created by Glacier to carry on the business in Portland. Melvin Erland, former president and general manager of the Pacific Building Materials Co., will be in charge of both divisions. END

Calendar of Coming Conventions

1959

June 8-9, 1959—
National Agricultural Limestone Institute, Mid-Year Meeting, Sheraton-Blackstone Hotel, Chicago, Ill.

June 8-9, 1959—
National Crushed Limestone Institute, Mid-Year Meeting, Sheraton-Blackstone Hotel, Chicago, Ill.

June 17-20, 1959—
Expanded Clay & Shale Association, mid-year meeting, Hotel Commodore, New York City

June 21-26, 1959—
American Society for Testing Materials, Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N.J.

September 14-17, 1959—
American Mining Congress, Convention, Metal Mining & Industrial Minerals, Denver, Colorado

September 27-30, 1959—
National Sand and Gravel Association, Semi-Annual Meeting, Board of Directors, Lake Placid Club, Lake Placid, N.Y.

October 11-16, 1959—
American Society for Testing Materials, Third Pacific Area National Meeting, Sheraton Palace Hotel, San Francisco, Calif.

February 22-24, 1960—
National Crushed Stone Association annual convention, Conrad Hilton Hotel, Chicago

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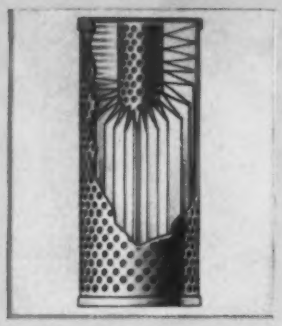
SPECIAL REPORT TO CATERPILLAR OWNERS:

CAT CATERPILLAR

Parts you can trust
Dependable round-the-clock service

CUT MAINTENANCE COSTS...EXTEND EQUIPMENT LIFE BY CHANGING OIL AND FILTERS AS RECOMMENDED



How often should lube oil and filters be changed? The answer is obvious—when the lube oil and filter can no longer do their jobs. But how do you know when that time comes? Can you afford to guess?

Guessing can be costly. The cost of oil changed *more frequently* than necessary adds up to big sums during a work season. *Delayed* oil changes can bring about premature overhauls with more parts replacement costs.

Manufacturer recommendations are based on sound principles. Rapid advancements have been made in perfecting "additive" lube oils that can reduce wear. The familiar ridge left in liners by the piston rings can be practically eliminated by the use of Series III Oils and proper maintenance practices! These oils also allow longer periods between changes.

Full benefit and savings from new oils cannot be had without proper filtering. Caterpillar Engines have an emergency by-pass valve that opens and allows unfiltered oil to circulate if the elements become clogged. And elements become clogged when their dirt-holding capacity is reached. Caterpillar elements have ample dirt-holding capacity to keep the by-pass *closed* over the recommended period.

But aren't the dirt-holding capacities of all makes of filters about the same? To protect the long life reputation of Cat Diesel Engines, Caterpillar continually tests all brands of elements offered for Cat Engines. Below are the *surprising* results, based on tests of filters purchased on the open market during 1957 and 1958. During these tests commercial test dust was gradually added to clean oil until each filter clogged and the emergency by-pass valve opened. The amount of dirt added is recorded in the "Sediment Index" column.

HOW CAT FILTERS COMPARE WITH OTHER BRANDS

Brand	Filtering Area (Square Inches)	Sediment Index (In Grams)	Comparison
CATERPILLAR	1450	75	Used as basis for recommended oil and element change periods.
BRAND A	1450	13	Cat element lasted nearly 6 times longer.
BRAND B	1170	22	Cat element lasted 3 times longer.
BRAND C	1000	34	Cat element lasted more than twice as long.
BRAND D	Not measurable	No oil flow	Opens by-pass immediately even when new.
BRAND E	1450	26	Cat element lasted nearly 3 times longer.

SERVICE TIP: Get your copy of "Crankcase Lubricating Oil Change Recommendations," Form 32421-1W, from your Caterpillar Dealer right away. Keep pace with the new lube oil developments.

Your Caterpillar Dealer has the complete story on the advantages of changing lube oil and filters as recommended. Ask him to figure your annual engine oil costs for you, and see how much you can save. See him today!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

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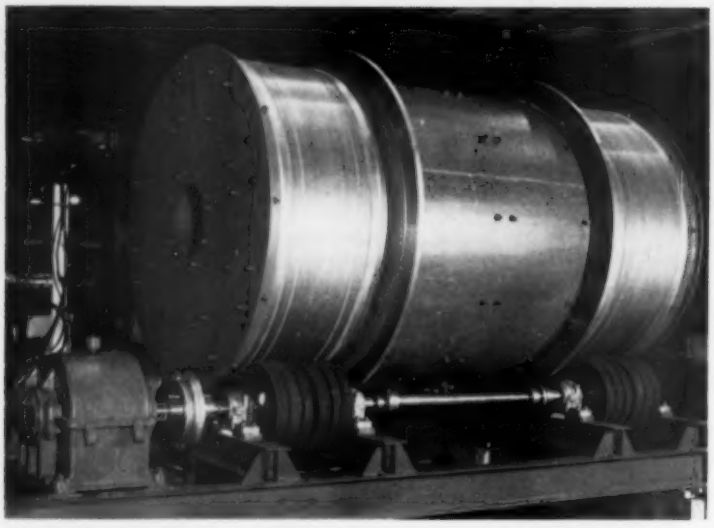
HINTS AND HELPS

Profit-making ideas developed by operating men



Drum rolls on rubber

A FRICTION DRIVE through solid rubber tires direct to the shell is an unusual feature of a new rotary scrubber. This new 7 x 12-ft. unit was recently installed in an Eastern crushed stone plant. The design was specified to reduce wear on the trunnion rollers and to give a smoother drive.

The drive arrangement consists of a 100 hp. wound rotor motor coupled through a double reduction reducer. The reducer drives the shaft on which the drive tires are mounted. Roller bearings reduce shaft misalignment.

Small bucket, big bite

AS LONG AS STANDARD size dump trucks came for the road base material, a southern granite producer's shovel had no difficulty. But when the trucks showed up with built-up extensions to increase capacity, the ¾-cu. yd. shovel couldn't keep ahead of the trucks.

Taking a cue from the trucks, the maintenance foreman built up the sides of the bucket. Steel plates were cut, fitted with brackets and bolted to the small bucket, adding about 50 percent to its capacity. There is no digging problem in the road base stone and the shovel operator can now keep ahead of the incoming trucks without strain. When there is a digging job to be done, the cheek plates can be removed.

Depressor drains water from reclaim belt

WATER OFTEN ACCUMULATES on the belts in reclaim tunnels, either from seepage from the piles of material above or from rain or melting snow. Whatever the source, the unwanted moisture makes a sloppy mess until it is carried away with the first run of material. But even this is no answer for the slushy mixture often refuses to climb an inclined belt, and pours over the edges at the bottom of the incline.

An eastern aggregates producer devised an ingenious belt depressor which is pneumatically operated and remotely controlled. At the end of each day the roller arm is lowered into position, forming a "pouring spout" on the belt which permits water to drain over the edge.

When the belt conveyor is started, a time-delay relay keeps the pneumatic valve in position to hold the device depressed for about 10 sec., time enough to dump every bit of water from the troughed belt. The concrete tunnel has the usual drain channels and sump to collect seepage and to remove it from the tunnel.

(Continued on page 71)

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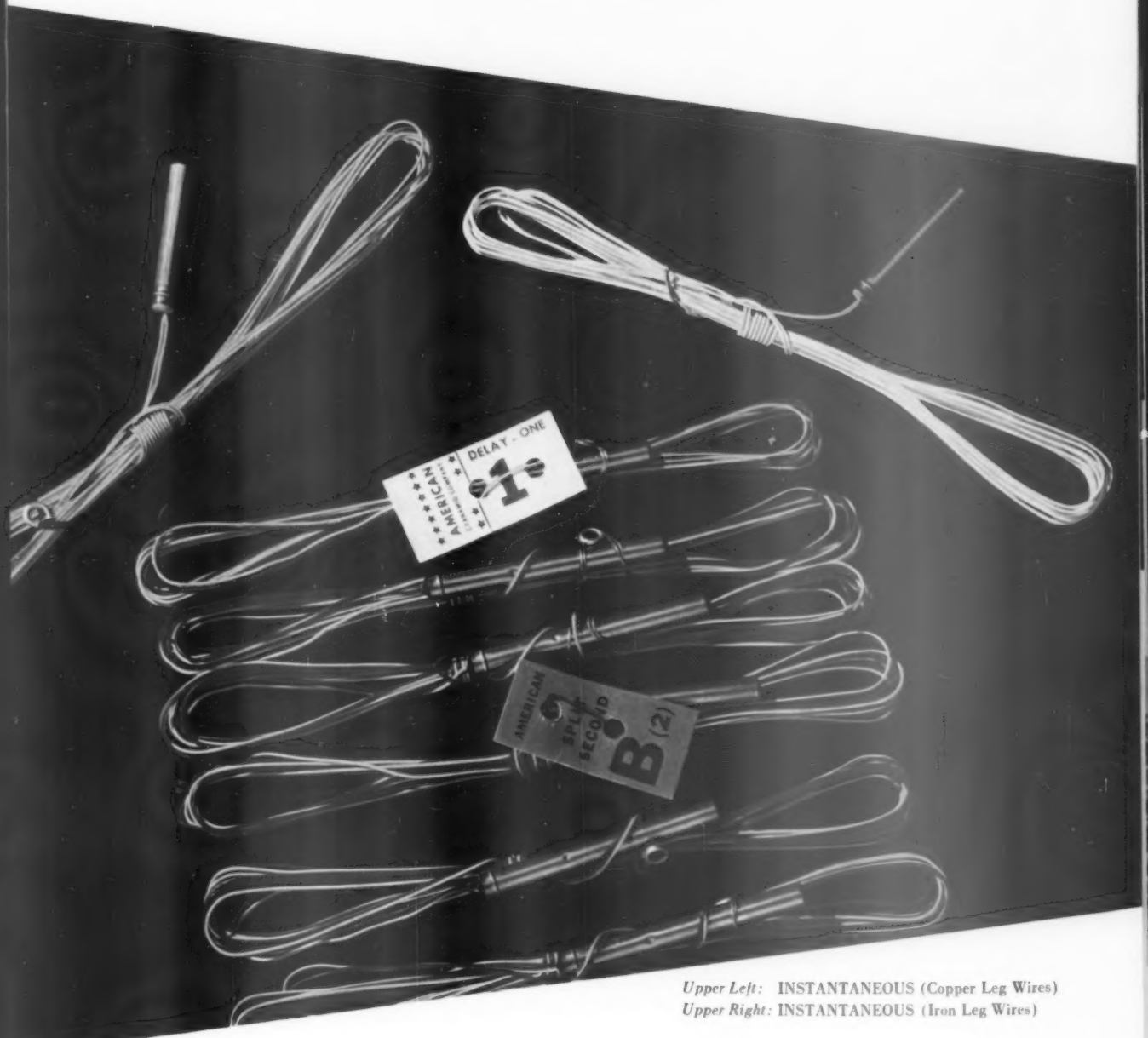
a million shots without a miss!!!*



Upper Left: INSTANTANEOUS (Copper Leg Wires)
Upper Right: INSTANTANEOUS (Iron Leg Wires)

Over the years, Cyanamid Electric Blasting Caps have achieved this enviable record for never-miss shooting. Millions of mine . . . quarry . . . and construction shots have been fired accurately, dependably and economically by using Cyanamid – the *best* in electric blasting caps! Cyanamid makes a cap for every blasting need.

Instantaneous, regular or split-second delays . . . Cyanamid Electric Blasting Caps offer you these advantages: CHOICE OF DELAYS • TIMING ACCURACY • HIGH DETONATION STRENGTH • SUPERIOR INSULATION • COLOR-CODED FOR EASY IDENTIFICATION.

Make every shot count! Insist on Cyanamid Blasting Caps and Explosives!

**An actual, documented case history of a leading coal mining company.*

AMERICAN CYANAMID COMPANY
EXPLOSIVES AND MINING CHEMICALS DEPARTMENT
30 Rockefeller Plaza, New York 20, N. Y.

CYANAMID

D-443

A Diamond 77 Plant

built to keep you in aggregate . . . at a profit

DIAMOND PORTABLE *Rotor-Lift* CRUSHING PLANTS

Diamond makes everything for the production of aggregate

- **Portable and stationary crushing plants**
- **Jaw crushers**
- **Roll crushers**
- **Vibrating screens**
- **Scalping and scrubbing screens**
- **Drag washers**
- **Conveyors**
- **Plate feeders**
- **Apron feeders**
- **Grizzlies**
- **Bins and hoppers**

Diamond has the equipment, experience, manufacturing facilities and distributor set-up to handle any size job to your satisfaction. Try them.

When you can turn out 300 to 400 tons of road gravel per hour in 25% to 35% crush, you're in a good profit position. That's what Diamond Portable Plants are doing in locations all over the country. Here's how and why—

- **line-flo system moves material through plant without delay—no extra scalpers, no by-passes, no bottlenecks.**
- **rotor-lift recirculates material fast, distributes it without batching or bunching on feed conveyor.**
- **long jaw design of jaw crusher handles the hardest of rock, gives maximum size uniformity.**
- **high speed roll crusher steps up output by eliminating reruns through jaw crusher, has high capacity for its weight, requires low h.p. per ton produced.**
- **balanced vibrating screen does thorough job of separating materials without clogging, can be depended upon for long, trouble-free service.**
- **belt conveyors run on antifriction bearings, move material quickly and smoothly.**

Add to these advantages complete portability in the pit or on the road without costly delay, and a choice of drives to best suit your conditions. It's easy then to see why companies that base their profit on aggregate production ability turn to Diamond when starting a new operation or expanding an existing one. Check with your Diamond distributor.

DIAMOND IRON WORKS

DIVISION

GOODMAN MANUFACTURING COMPANY

Halsted Street and 48th Place • Chicago 9, Illinois

Enter 1228 on Reader Card

(Continued from page 68)

Color-coded workers?

MAYBE IT'S THE CLIMATE which stimulated rock products producers in two widely separate areas to break with tradition in the selection of colored safety hats for their workers. In both Florida and Hawaii we have seen safety hats worn in a gamut of brilliant pastel colors. We can't say if they glow in the dark, but in the hard glare of the tropic sunshine the rainbow hues can be seen "a mile away."

But there is more than esthetic value in this practice. Producers found that now workers from each department can be readily identified at a distance. This improves supervision, speeds maintenance and emergency work, controls outsiders and above all, vastly improves plant safety.

Safety is especially important in big plants with a large number of employes and where there may be contractor's people and a lot of visitors. Regular employes can now identify these people and can easily spot them in restricted or hazardous areas—quarries, construction or demolition sites, laboratories — and unauthorized visitors can be controlled.

Personnel managers have discovered an unexpected advantage in the use of color-coded hats. Not only has personnel recognition in the whole plant been improved, but each small department has developed a team spirit which would have been difficult to get in any other way.

The idea is apparently too new for any definite code to have developed. So far it seems to have depended upon the available colors and the ingenuity of the workers in developing suitable marks and designs. One cement plant has issued aluminum hats to supervisors, white to visitors and yellow to maintenance men. Each production department wears a different color which has been selected from available hues.

Hose care

THERE'S NO NEED to hang air hose on a hook, or to let it get underfoot where it can be damaged. Half a tire rim makes an ideal hanger for this soft, pliable hose. If a bent plate or a small angle is used as a cross brace, it can hold a tire gauge, extra stems and other tire accessories.

Harry Hess
Houston 4, Texas

Sand scalper cleans deposit of excess sand

A MIDWESTERN SAND and gravel producer finds that he has an excess of sand in his deposit. His problem: How to scalp it out effectively without interfering with production.

The answer proved to be a rail spur into the production area. As the raw material is stockpiled a dragline feeds a rail-mounted desanding machine. Gravel is scalped off and is discharged to gondolas for the short trip to the washing plant. Excess sand is dropped to a stacking belt which piles sand in a vast storage area.

Rails are laid as quickly as the dragline clears space for them. The machine is moved forward and the spur extended to keep up with it.

Truck surgery pays off in increased capacity

AN INGENIOUS maintenance foreman of an eastern rock producer hit upon the idea of increasing the capacity of haulage trucks by extending the frame. The longer frame then could support a larger body, increasing capacity from 10 to 13 cu. yd.

Before all the firm's trucks could be reworked, the question came up. "Why stop at 13 cu. yd.?" Calculations showed that the frame could be extended to accommodate a 15-cu. yd. body without exceeding safe design. Now seven truck units are scheduled for the surgery which will add 50 percent to the capacity of each. The conversion task takes about two weeks with a welder and mechanic. **END**

Stockbridge Stone Division, Vulcan Materials Company,

GULF MAKES THINGS

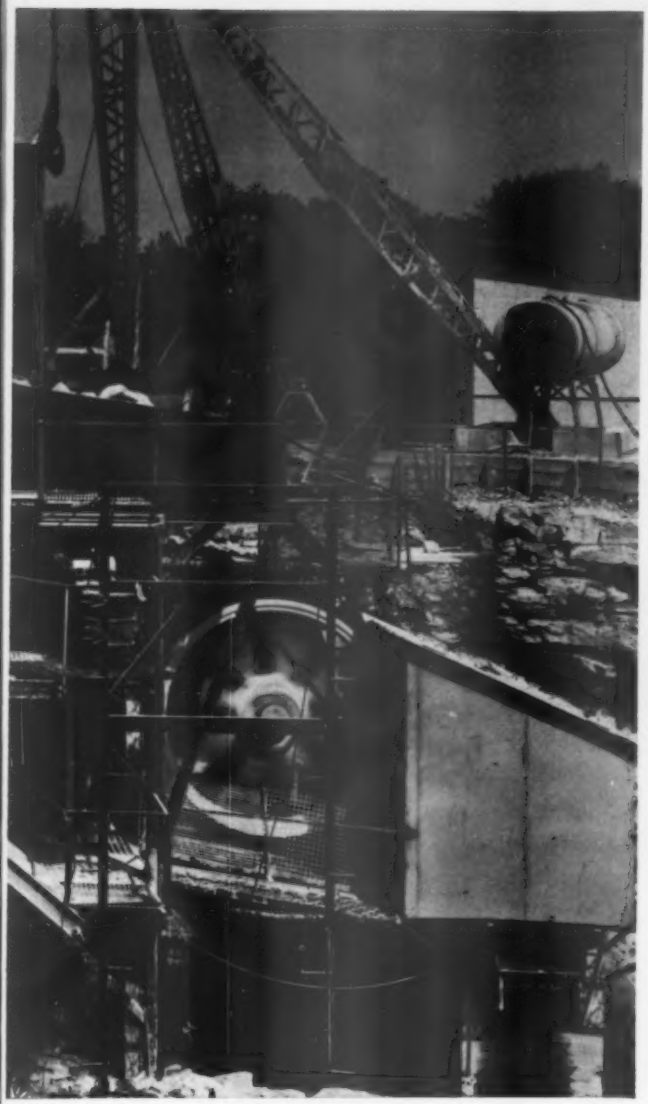
Ask Harold Boring, Plant Superintendent of Stockbridge Stone Division, Atlanta, Georgia, how Gulf makes things run better. He'll show you a streamlined operation that turns out 5,000 tons of crushed granite a day.

Stockbridge Stone uses Gulf fuels and lubricants to provide an extra measure of protection for their huge investment in equipment.

"Our equipment," reports Mr. Boring, "includes a huge jaw crusher, four recrushers, two drills, two draglines, two dozers and five 35-ton Mack diesel trucks. The trucks alone represent over a $300,000 investment.

"To protect our equipment, we use the most effective lubricants we can get and we make sure they're changed at the proper intervals. And that's pretty often with us. Our policy is that grease and oil are cheaper than downtime.

"For instance, to protect the babbitt bearing in the jaw crusher, every day we pump in about 100 pounds of Gulfcrown Grease No. 1 — which serves as both lubricant and flushing agent. The



Granite loads up to 28 tons are hauled by 35-ton Mack diesels at this Stockbridge Stone granite quarry. Gulf Dieselect is the fuel. Gulf Dieselube H.D. is used for crankcase lubrication.

Quarry man checks with Gulf men. Harold Boring, center, Plant Superintendent at Stockbridge granite quarry, discusses maintenance of 35-ton Mack with Gulf Sales Representatives C. E. Reese and J. C. Estes.

King-sized jaw crusher at Stockbridge Stone granite quarry, where Gulfcrown Grease protects babbitt bearings against the abrasive action of granite dust.

crushes 5,000 tons of granite a day, finds that . . .

RUN BETTER!

drives of the smaller crushers are lubricated with Gulf Harmony oil.

"In lubricating the Mack diesels, we don't take any chances either. The crankcase lubricant is Gulf Dieselube H.D., and we change it every 120 hours of operation. We're completely satisfied with Gulf products, service and delivery."

How about *your* operation? See how Gulf makes things run better. Call your nearest Gulf office. Meanwhile, mail coupon for 88-page "Contractors' Guide."

GULF

GULF OIL CORPORATION
Dept. DM, Gulf Bldg., Pittsburgh 30, Pa.
Send copy of your new "Contractors' Guide."

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Title_____

Company_____

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City_____ Zone_____ State_____

RP-5288

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THIS MONTH'S CERTIFIED OWNER REPORTS

ROCK & FILL INC., FT. LAUDERDALE, FLA.

"Tires Last 7 Times Longer on Case W-9"

Loading Florida's highly abrasive coral rock and sand is so rough on equipment that Rock & Fill Inc., of Ft. Lauderdale, found tires on competitive-make loaders lasted only about *one month*, due to excessive wheel slippage. However, after switching to a 6000-lb. capacity Case W-9, with its *smooth-pulling* 4-wheel-drive, and power-transfer differential, Manager R. W. Hottenstein reports, "We've been running continuously *60 hours a week for over seven months without downtime or noticeable tire wear.*"

JAMES BROS., WAUKESHA, WIS.

"Our Case W-9 Loads 7-yd. Trucks in 2 Min."

Rudy Schilberg, Vice President of James Brothers Sand & Gravel Co. says: "This 1¾-cu. yd. Case Terra-load'r beats anything we've ever owned. It's much faster, easier to handle, and gets much bigger loads of bank-run sand without stalling. Its breakaway force is terrific! With the W-9, I can load 7-cu. yd. trucks in 2 minutes, 10-yard jobs in about 3 minutes." Schilberg also likes the speed, balance and mobility of the W-9 for handling multiple stockpiling and loading operations over a ½-mile plant area.

M&S STONE QUARRIES, GRANTSVILLE, MD.

"Best Crawler We've Seen for Rock"

Renell Giconi, owner of M&S Stone Quarries, readily admits his operation of prying huge slabs of rock, 4′ to 20′ long, out of a mountain top, is real punishment for any tractor. "Competitive crawlers just couldn't take it," Giconi reports, "but this Case 1000 power-angling dozer has the *best track system I've ever seen.* It absorbs all the pounding we give it and comes back for more."

"The automatic torque converter in Case Terramatic Drive is also a big advantage," Giconi continues, "because it gives the '1000' *double the crowding power without shock loads, and without clutching or stalling.* Case power-steering and power-shift are important, too, since I have only one hand for operating the controls.

"When it comes to maneuverability, for prying out rock, building access roads and stripping topsoil, we've never seen anything to match the Case 1000's *counter-rotating* tracks, and ability to *power-angle* the blade to the right position on-the-go from the operator's seat."

Get the complete CASE story ...TODAY

CASE

J. I. CASE CO., RACINE, WIS.

World's most advanced line of wheel and crawler machines for earthmoving and materials handling

CLIP . . . MAIL . . . FOR FREE LITERATURE

J. I. CASE CO., Dept. F1479, Racine, Wisconsin

Rush full information on: ☐ W-9 Terraload'r
☐ Model 1000 Power-Angling Dozer
☐ Have nearest dealer representative call

Name ..... Title .....

Company .....

Address .....

City ..... State .....

CT-CL-317

Are the rock industries polluting our waters?

*by C. N. Durfor & G. W. Whetstone**

THE ROCK INDUSTRIES TODAY are facing up to their responsibilities in a serious domestic problem: the pollution of our rivers and streams. Those rock producers who haven't yet run afoul of this problem are likely to do so in the near future. Pollution is a serious and pressing problem. Every rock products operator should be aware of it—and understand the part his industry plays in causing it, and what he can do to help abate it.

Today the United States has as much water as it ever had—and will ever have; no more, no less. But the use of water is increasing amazingly. It is the most used raw material in our factories. It takes 220,000 gal. to produce a ton of rayon yarn,

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Geologist samples suspended sediment from the Cedar River, Belgrade, Nebr., with a DH-48 hand sampler. Water-sediment samples are collected in the pint bottles which are inserted into the sampler

Pollution of our rivers and streams is a serious and pressing problem . . .

more than 770,000 gal. for 1,000 bbl. of crude petroleum. In 1955, industry used 45 percent of total water used. It may use 65 percent in 1975.

Our population is expected to increase 50 million by 1975; by then, our water use will have increased by 90 percent. This volume will require the flow of several Colorado rivers, and a lot of earnest people are wondering where we're going to get them. The sobering fact is that, although the demand increases, the supply remains the same.

Secretary of the Interior Seaton recently stated, "Despite all our hopes, water shortages in certain areas will come again."

The natural water courses of the United States are Nature's sewers. They carry the excess water from the land and transport inorganic material from erosional processes, and organic matter from decaying vegetation. In addition to natural waste products, man puts in the water courses his wastes and refuse from sewage plants, mining operations and manufacturing establishments.

Excessive pollution is a waste of water, and we as a nation must tackle this problem in deadly earnest. We must recognize that pollution control is one of the most effective and economical water conservation measures available to us. Pollution can be and often is just as effective in limiting the use of water as though drought had denied us the water in the first place.

Changes in rock products technology in the past few decades have caused increased demands for water. For example, more water is used in hydroclassifiers as a result of the larger number of classifications of sand and gravel. More thorough washings are needed to remove deleterious materials shot down in a quarry which might have been washed out of the seams and holes by hydraulic stripping. The control of air pollution has increased the amount of water used in dust control sprays. Many cement plants have turned to the wet process which requires the addition of 30 to 40 percent by weight of water in the preparation of the slurries for burning.

It is just as impossible to define all the uses of water in the rock products industry as it is to list all the sources of pollution. The major use of water in one type of plant may be a minor or non-existent use in another. Impurities in raw materials will vary from place to place even in the same plant, causing various pollution problems.

To evaluate potential sources of pollution, let us examine the major uses of water, the impurities placed in the water and the end disposal of the used or reused water.

Quarried rock is screened, washed and calcined in the preparation of hydrated lime and hydrated gypsum. Water in the raw limestone and gypsum, which is driven off as a vapor, is not a source of pollution. The water of hydration added to the calcined rock is entirely consumed in the finished product. There is, then, no problem of disposing of the used water. Many limestone and gypsum plants are located on a river bank and receive their raw materials by water. Raw limestone and gypsum may be stockpiled in the open on the banks of streams. These stockpiles, plus those of waste limestone and gypsum in spoil areas, could be leached during storms unless precautions are taken. The heavy runoff and the resultant chemical waste waters could enter the stream.

Successful hydraulic stripping requires an ample supply of water and adequate waste-disposal facilities to prevent the soil-rock-water mixture from entering the nearby streams. Deposits of this mixture reduce a stream's hydraulic capacity and increase the dangers of overbank flooding. If the waste water is sent to an efficient settling basin, the water may be clean enough to reuse. A recent survey of an area by the Bureau of Mines revealed that 45 percent of the producers of stone, clay and glass products discharged effluents containing suspended inert solids. Unless adequate and efficient sediment detention basins are used, these pieces of rock, sediment and abrasive could pollute the stream.

Washing and classifying water constitute the largest use of water in the rock products industry. A larger number of treatment processes of sand and gravel increase the amount of water used. Washing removes silt, clay, shales, coals, soft stones, roots, twigs and other trash from the desired product, and mud and clay are reduced to a fineness that is carried away in suspension.

The amount of water for washing and classifying depends on the impurities that must be removed. Loam may wash out easily while some clay

Every rock products operator should be aware part his industry plays in causing it

Water pollution *continued . . .*

materials are difficult to wash out. The amount of water used depends upon the type and degree of classification desired. More water is used to retain down to 100 mesh only, than to retain 200 mesh.

Most wash water can be used over and over again after removing the suspended solids. The average amount of water used for washing sand and gravel in the northeast is about 460 gal. per ton of sand and gravel. This figure is higher than for other parts of the country.

Washing of sand and gravel usually produces no large change in the chemical content of the wash water. Unless the sediments are retained by thickeners, settling basins or lagoons, wash water will increase the sediment load and turbidity of the receiving stream. This sediment load could shift the channel and change the course of the receiving stream. Waste waters containing very fine matter may increase the turbidity of the water, which diminishes the penetration of light that interferes with the growth of some plants important in the fish food cycle. Increased sediment concentration may also reduce the fish population.

Some of the more common complaints against sand and gravel plants are: "discharging clay water," "the effluent was milky in color," and "cloudy condition of stream caused by sand fines." These cloudy conditions are caused by very small particles that remain suspended for a long time.

Dirty water used for washing the holds of cargo ships is a potential source of pollution. The wash water from washing equipment and washing concrete trucks contains sediment and other foreign material which could increase the turbidity and sediment load of the receiving stream. The slurry from dust-control sprays is a source of pollution unless intercepted by a settling basin. The dredging of sand and gravel from beds of flowing streams increases the turbidity and sediment concentration of the stream. This is difficult to prevent.

It is difficult to evaluate all potential sources of, or solutions for, pollution in the portland cement, sand and gravel, crushed stone, lime and gypsum industries. Even in the same basic industry the operation of one plant may be quite different from the operation of another plant a few miles downstream. The pollution problem can best be solved by having each individual employe look around in his own plant with the following questions in mind: Will my waste water be in any worse condition than my primary water? Can I prevent this water from polluting nearby streams?

The solution to the pollution problem would be to prevent the introduction of all inert solid wastes into rivers and streams. Most of the suspended solids can be kept out of streams. Waste waters can be processed through properly constructed, operated and maintained settling basins and lagoons of adequate size. Strict pollution abatement regulations make the operation of a thickener, settling basin or lagoon a necessity for all plants discharging suspended solids.

Tailing ponds should be designed for the projected life of the plant; they should be big enough to hold the tons of solids that would be deposited during the period. An idea of the sediment storage requirements for tailing ponds is obtained by multiplying the maximum life of the plant by the amount of waste water yearly by the percent of solids present in the waste water. Conversion to the appropriate units of volume is necessary.

The larger the tailing pond, the more efficient it will be and the longer it will serve. The waste water should be dispersed into the tailing ponds at many locations; otherwise, the deposited solids may tend to pile-up in one location. Site for the tailing ponds should be carefully selected, even before the selection of the location of many other plant operations. The ideal site for the tailing pond is in the elbow of a hill or a mountain, which could serve as two sides of the retaining walls of the settling basin. In some locations, suitable settling basins could be improvised from existing marshes, lagoons or excavations.

A sand dam across a valley should be avoided. The valley may drain a large drainage basin during storms, and the tailing pond might be broken and the wastes carried downstream. Once the site for the tailing pond has been selected, the local weather, runoff data and drainage pattern should be studied to determine the probable extent of all inflow into the pond. It may be necessary to install adequate drainage tunnels to drain off excess runoff from the tailing pond. All waste water containing suspended solids should be run into the tailing ponds. The cleared water from the settling basin then is usable for most plant operations.

Land may not be available for the construction of tailing ponds, or the available land adjacent to the plant may not be adaptable to the construc-

of the pollution problem, and understand the and what he can do to help abate it

tion of settling basins. Then it may be necessary to use thickeners and settling tanks to retain inert solids.

Engineering principles should be applied to the construction and operation of settling tanks. For example, long narrow tanks are more effective for settling suspended solids than short wide tanks or circular tanks. H. R. Murdock states that "a sedimentation tank with a length of 20 or more times the depth and width will have a non-turbulent settling area about 90 percent of the length of the tank." A recent survey shows that 60 percent of the producers of stone, clay and glass products used settling basins. But most of them were not well engineered and were not operated at maximum efficiency.

Before deciding to construct a settling tank, it is wise to calculate the load of sediment that will be put into the settling tank, and to calculate how often the tank will have to be cleaned to operate efficiently. Allowances should be made for sludge removal equipment and scouring the deposited sediments. Settling tanks should be inspected and cleaned frequently to be maintained at maximum efficiency. Unless the settled materials are removed from the settling tanks at frequent intervals, the effective depth of the tank decreases, and the sediment-laden wash water simply flows out of the tank without dropping any suspended solids.

Stricter water pollution control regulations require that the wastes from hydraulic stripping be kept out of the streams. It is mandatory that the overburden be collected in an excavated pit, swamp, or behind a dam structure of some sort. Facilities for doing this should be available before any type of stripping operation is started. The recovered overburden could be used to fill swamps, ravines and other low places. Leveling off of these piles and restoring the land for farming, park areas, lakes and industrial sites, could create better community good-will. It could help to keep the rock products industries from undesirable zoning regulations. The sale of the reclaimed land may pay for the stripping or grading cost—and perhaps even make a profit.

The solution to stream pollution problems should include not only the negative aspects of the problem, but also the benefits that might be derived from the use of by-products from the treatment of wastes and the re-use of effluent. Recovery of marketable wastes and consequent pollution control hold possibly the greatest hope for solving the industrial waste problem.

For example, a steel company in the Ohio River valley built a treatment plant at a cost of $516,000 to recover ore from blast-furnace flue dust that was being dumped into the river. The company found that treatment was not only paying for its operation, but that it made a profit of $581,000 in the first year of operation.

Many operators of sand and gravel pits must buy sand fines to meet specifications for certain jobs. Sand fines carried away by waste waters, then, may be an economic loss. Recovery of these sand fines from discharge waters cuts down on the load of suspended solids entering the nearby streams, and it may pay for the process of recovery and even make a profit for the producer. A limestone plant in Pennsylvania, which handles 70 to 75 tph., reported that it is now reclaiming 100 tons of salable fines material daily from wash waters formerly wasted. A plant recovering sand from its waste waters could keep a list of potential customers who would be interested in the waste recovery products.

A large reduction in the amount of pollution contributed by the minerals industry would result from limiting the volume of waste water discharged from the plant. Most water used in washing and classifying, dust sprays, hydraulic stripping and washing equipment can be reused after removing the inert suspended solids. Rainwater and runoff, which has drained into quarries and pits, can be used for most operations after the suspended solids are settled.

The authority to control water pollution began with common law. This states that no right can be acquired for use of a water that causes loss or undue hardship to a downstream user. Punitive measures were taken at first, only after the pollution was accomplished and the damage done. The need for restraint of pollution of water grew; now many health departments have statutory powers for pollution control. Similar powers were given to other agencies for the protection of fish and game resources. During the last decade, new legislation was developed to meet the need for more positive action in the water pollution control field, and new agencies were created to administer the regulations.

The Federal Water Pollution Control Act of 1948 was responsible for many of these new State agencies. This Act, and the subsequent Act of

1956, states that the policy of the Congress is "to recognize, preserve and protect the primary responsibilities and rights of the States in controlling water pollution."

The Act of 1956 authorizes continued Federal-State-interstate cooperation in the preparation and development of comprehensive programs for controlling water pollution. It encourages cooperative activities by the States in the enactment of improved laws to control interstate pollution. Increased technical assistance to States is authorized through a broader research program, the establishment of research fellowships and the use of contract research and research grants.

During the last two decades, there has been a rapid development of governmental responsibilities at all levels in the field of water pollution control. Today all States have some type of pollution control laws, and over three-fourths of the States have enacted new regulations within the last ten years.

The new State agencies are known under a variety of names: Board of Health, Water Pollution Control Commission, Water Resources Commission, Sanitary Water Board and many others. Their main duty is to develop pollution control programs for the states and to cooperate with interstate agencies in controlling pollution in interstate streams.

Many States give authority to the Water Pollution Control Agency to set standards of water purity and to regulate the pollution allowable in industrial effluents going into streams. The State may have the authority "to require the use of methods which are not only scientifically possible, but also economically feasible and physically attainable from a standpoint to prevent and control the pollution of the waters of the State," to cite one State regulation.

One of the most significant developments in the pollution control field has been the organization of interstate or basin regulatory agencies. Present and future development may require different standards of quality for each drainage area to satisfy the needs of the people for livelihood and leisure-time activities.

Representatives of industry also have been formed to help tackle water pollution. For example, in the Ohio basin, this committee includes: Aquatic Life, Chemical Industry, Coal Industry, Metal-Finishing, Oil Refining, Pulp and Paper, Steel Industry and Water-Users. These committees act as clearing houses for information about the problems faced by industrial management in meeting pollution-abatement requirements.

Commenting on legal problems of waste disposal in the rock industries, Well A. Hutchins of U. S. Dept. of Agriculture said recently: "The public interest in control of pollution of natural stream channels goes beyond the question of injuries to individual property holders. It extends both to the preservation of natural streamways and other sources of water supply for all the beneficial purposes to which these resources may be put, and also to prevention of unsanitary conditions. Methods of disposal of waste from mining operations, therefore, must be such as to avoid both substantial injury to private property and also conflicts with public regulatory measures."

While present philosophy takes a broad look at existing pollution problems in line with wise use of our natural resources, this does not suggest that industries may dispose of wastes indiscriminately. Many States have regulations like this one: "Persons engaged in the business of mining and Mineral or subterranean product in the State must provide necessary places of deposit for the waste, wash or debris of any mine or mines operated, and must provide settling pools of sufficient capacity to prevent the escape of waste, wash or debris into waters of the State." These and similar regulations of a specific nature are readily enforceable. Some states issue orders to abate pollution immediately when violations are brought to their attention.

Some insist that a hearing be held with the aggrieved party present before the order is effective. In nearly every State the actions, decisions and orders of the control agencies are subject to appeal in state courts, and enforcement of the statutes and regulations is obtained through the courts. South Carolina legislation states that, if the regulatory agency finds there is no practical method of treatment of an industrial waste, the agency may not order abatement until it provides a method for the disposal of the waste in question.

The increased productivity of the rock products industries brings increased water use requirements. The decreased availability of water supply, and stricter pollution control regulations require greater vigilance and improved techniques in controlling the amount of sand, silt and other inert solids discharged into Nature's waterways. Pollution should not be the exclusive responsibility of any one individual in the plant—cooperation of all employes should be encouraged. Rock operators should be encouraged to discuss their pollution problems and to publicize the successful efforts in the abatement of pollution. END

With improved kiln design and regenerative clinker cooling, kiln capacity may double or triple; smaller kilns would give larger production of cement clinker

Let's look at kiln efficiency

by Victor J. Azbe*

This ideal concept of kiln design approaches the problem of cement making efficiency in a different way. Mr. Azbe shows how it may be possible for kilns of the future to achieve 60 to 70 percent thermal efficiency. With improved kiln design and regenerative clinker cooling, kiln capacity may double or triple; smaller kilns would give larger production of cement clinker.

LIME AND CEMENT CLINKERING KILNS are calciners, for in both the dominating endothermic reaction is lime production; but the cement kiln process is much more complex. In the lime kiln the charge is calcareous (limestone). In the cement kiln the charge is about two-thirds calcareous and one-third of what we will call argillaceous. The chemical reactions of these admixed components at a high temperature yield cement clinker, and considerable heat is developed in the process. There are a great number of these reactions, and the kiln possesses a greater number of zones which extend its length.

The cement kiln has two separate sources of heat supply; the exothermic of fuel burning, and the exothermic of cement clinker formation. In a lime kiln the only heat source is the fuel.

There are special benefits inherent in the exothermic heat of cement clinker reaction. These have a value greater than is inherent in the heat of the fuel. It does not involve combustion and a loss in the products of combustion, but is developed in the bed of material heating up the bed and aiding the reaction. Unless lost by radiation, virtually all this heat is recoverable in the clinker cooler.

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Another advantage of the cement kiln over the lime kiln is that it's argillaceous component, nearly a third of the cement weight, absorbs heat from the gases passing to waste in the preheating zone of the kiln. Then, in a properly functioning clinker cooler, it would release heat through preheating of the air. This heat would not only be recovered, but would be regenerated. The heat of escaping gases of low temperature, incapable of calcining would, after regenerative recovery, become in effect, the equivalent of heat of high temperature level, fully usable toward purposes of calcination.

Even though the cement kiln has these advantages, full benefit is not taken of them. The general run of cement kiln has normally lower thermal efficiency and volumetric efficiency than the lime kiln. That this is so, is partially due to misdirected effort, because the losses are not fully understood and, therefore, are not placed in the proper perspective for their correction. There are continuous and even heroic attempts being made to improve the cement kiln, but even at the best only about 40 percent of the heat available from the two exothermic sources is utilized regardless of how favorable the kiln charge is in its composition. There is more utilized when waste heat boilers are used in the wet process for the drying of slurry. However, the efficiency of the dry portion of the kiln is still but 40 percent or less—often considerably less.

Let us compare lime and cement kiln thermal performance on the basis of exothermic and endothermic heat ratios. Since in both the endothermic quantities are centered in lime, the curves of Fig. 1 would apply. Curve A is per ton of lime in a lime

Let's look at kiln efficiency *continued . . .*

kiln, curve B per ton of CaO taken on by cement clinker and curve C, per ton of clinker proper. The difference between A and B is due to the heat of exothermic reactions of cement clinker formation.

Comparing the cement kiln with the lime kiln at 40 and 20 percent efficiency, we obtain the figures in Table I. As cement kilns go, 5.4 million per ton of CaO is exceedingly good. But 7.1 million Btu. for a lime kiln, while not exactly bad, is not good. At 20 percent efficiency, 10.8 million for the cement kiln is common, while 14.2 million for the lime kiln is almost impossibly poor; the lowest record that we have is 13 million. This means that when the cement kiln efficiency is poor it is worse than the poorest of lime kilns, and at its best it does not equal a fairly good lime kiln. When we realize that the cement kiln has a higher ratio of high-level heat to low-level heat, this should not be so: The reverse should be true. As we puzzle over the matter it becomes apparent that, under the system here presented, 70 percent efficiency—more than double the average of today—is more possible in the cement kiln than in the lime kiln.

Table I—Heat of fuel in million Btu.

	Cement Kiln		Lime Kiln
Efficiency—Percent	Per Ton Clinker	Per Ton CaO in Clinker	Per Ton of Lime
20	6.95	10.8	14.2
40	3.47	5.4	7.1
70	2.00	3.1	4.05

There are four reasons why the cement kiln is not more efficient and why its capacity for its size is not greater. One, the kiln is a very good heat generator but a very poor heat absorber. Secondly, not as much sensible heat of the clinker is not recovered as should be, causing more of a loss than it may be realized. The third is that as the kiln's ineffectiveness as a heat transfer apparatus calls for higher temperatures and for larger kilns, there are greater external areas and higher radiation losses.

The fourth and foremost reason is the failure to realize what these losses mean to production. They are looked upon as percentages of heat input, when more properly they should be evaluated in respect to product output. Assuming a simple case, a kiln producing 500 tons of clinker, having a radiation heat loss on the basis of heat input of 20 percent and an overall kiln thermal efficiency of 20 percent, the radiation loss is not really 20 percent: It

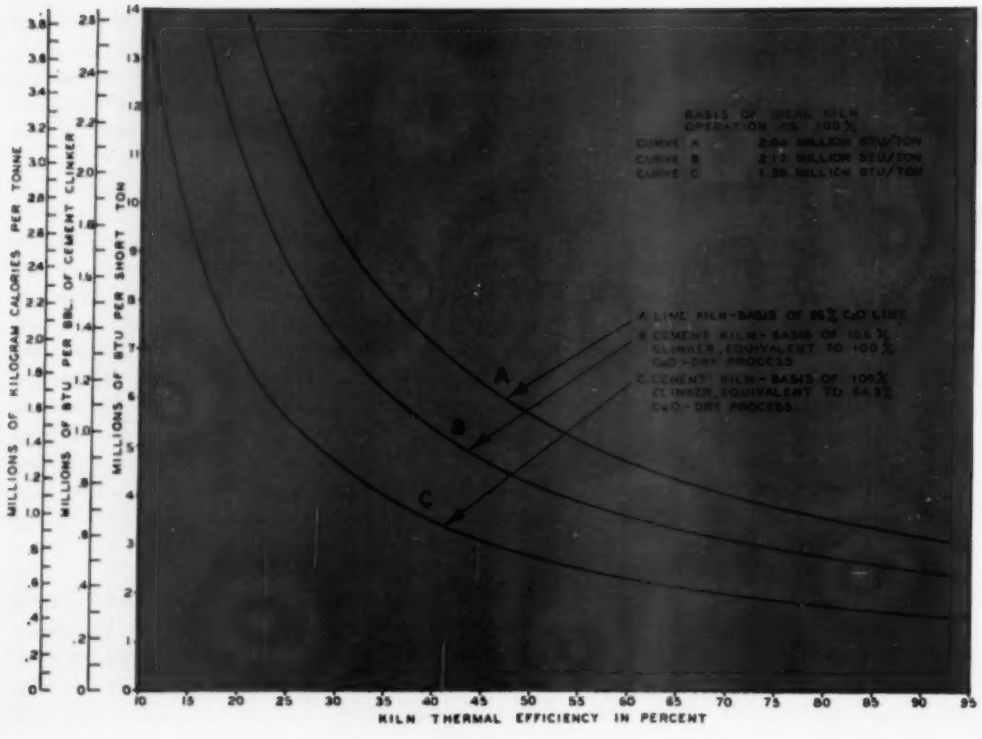
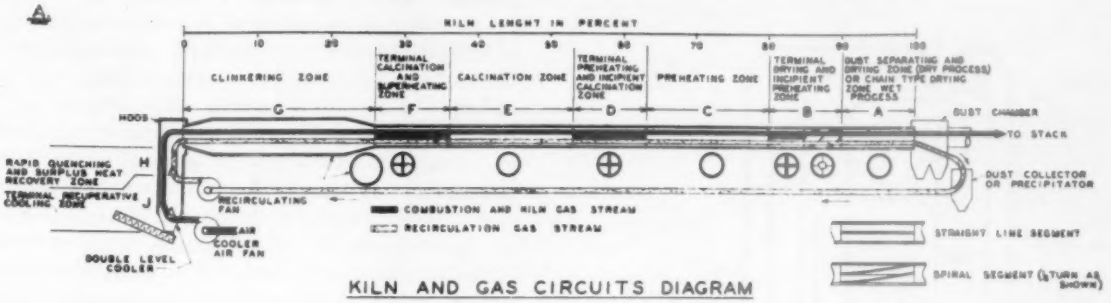
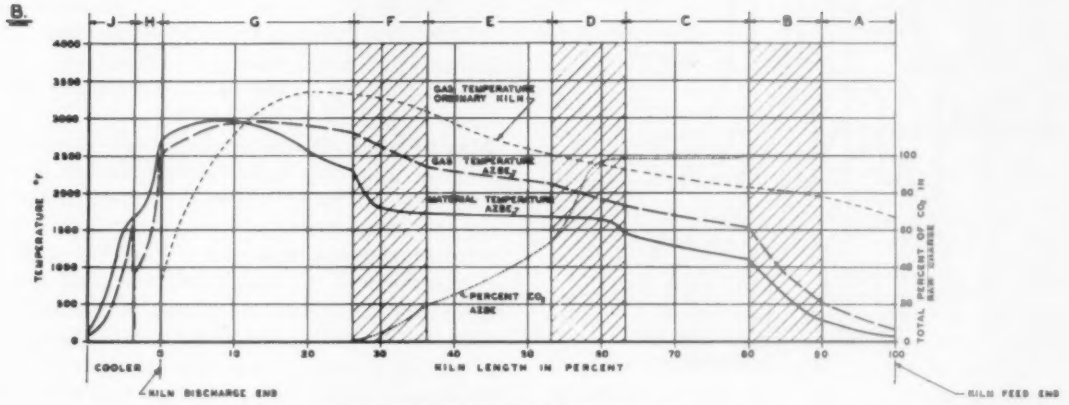

MILLIONS OF KILOGRAM CALORIES PER TONNE
MILLIONS OF BTU PER BBL. OF CEMENT CLINKER
MILLIONS OF BTU PER SHORT TON
KILN THERMAL EFFICIENCY IN PERCENT
A
B
C

Figure 1
Kiln thermal efficiency; the difference between A and B is due to the heat of exothermic reactions of cement clinker formation

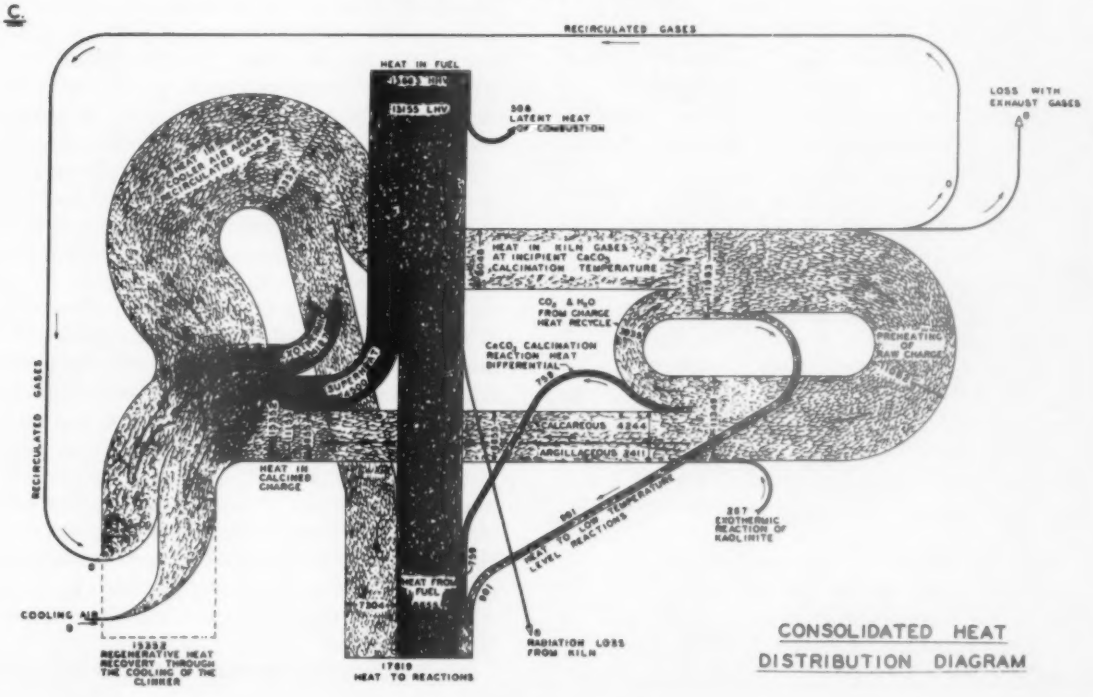
Figure 2 Schematic A features the Azbe concept of a cement clinker kiln system in its basic principle; graph B presents the temperature gradients and CO_2 content of the various zones; flow diagram C presents the various heat circuits on the basis of 100 percent thermal efficiency of which 70 percent or even more should eventually be realized


A
KILN LENGHT IN PERCENT
CLINKERING ZONE
TERMINAL CALCINATION AND REHEATING ZONE
CALCINATION ZONE
TERMINAL PREHEATING AND INCIPIENT CALCINATION ZONE
PREHEATING ZONE
TERMINAL DRYING AND INCIPIENT PREHEATING ZONE
DUST SEPARATING AND DRYING ZONE (DRY PROCESS) OR CHAIN TYPE DRYING ZONE WET PROCESS
HOOD
DUST CHAMBER
TO STACK
RAPID QUENCHING AND SURPLUS HEAT RECOVERY ZONE
TERMINAL RECUPERATIVE COOLING ZONE
DUST COLLECTOR OR PRECIPITATOR
RECIRCULATING FAN
COMBUSTION AND KILN GAS STREAM
RECIRCULATION GAS STREAM
AIR COOLER AIR FAN
DOUBLE LEVEL COOLER
STRAIGHT LINE SEGMENT
SPIRAL SEGMENT (½ TURN AS SHOWN)

KILN AND GAS CIRCUITS DIAGRAM



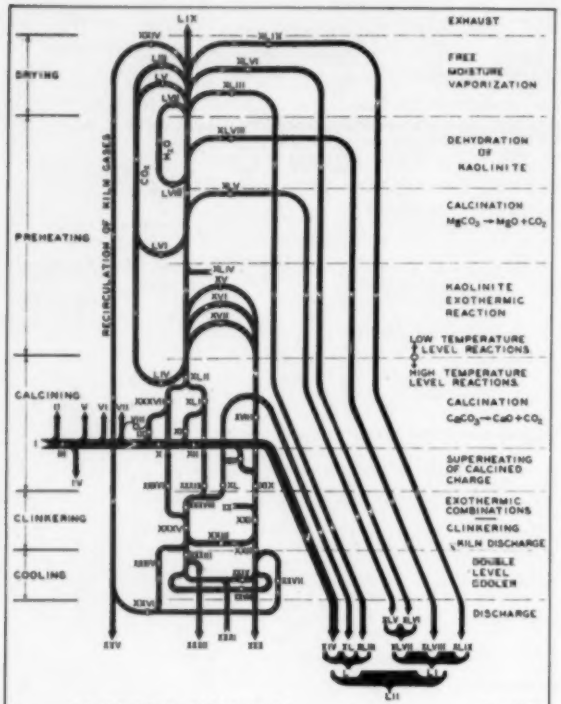
KILN TEMPERATURE GRADIENTS


C
RECIRCULATED GASES
HEAT IN FUEL
13155 LHV
5% LATENT HEAT OF COMBUSTION
LOSS WITH EXHAUST GASES
HEAT IN KILN GASES AT INCIPIENT CaCO3 CALCINATION TEMPERATURE
CO2 & H2O FROM CHARGE HEAT RECYCLE
CaCO3 CALCINATION REACTION HEAT DIFFERENTIAL
PREHEATING OF RAW CHARGE
CALCAREOUS 4264
ARGILLACEOUS 2411
HEAT IN CALCINED CHARGE
HEAT TO LOW TEMPERATURE LEVEL REACTIONS
26% EXOTHERMIC REACTION OF RADLIRITE
RECIRCULATED GASES
COOLING AIR
15332 REGENERATIVE HEAT RECOVERY THROUGH THE COOLING OF THE CLINKER
17819 HEAT TO REACTIONS
RADIATION LOSS FROM KILN

CONSOLIDATED HEAT DISTRIBUTION DIAGRAM

Let's look at kiln efficiency *continued . . .*

Figure 3 Cement kiln heat balance diagram



I	Heat of fuel-basis of high heat value	Btu. 13431
II	Loss due latent heat of H_2O from combustion of H_2	998
III	Heat of fuel-basis of low heat value	12433
IV	Heat loss due to radiation from all kiln zones	0
V	Loss of sensible heat of excess air at 1525° F.	0
VI	Loss due to dust - sensible and heat of recarbonation	0
VII	Loss due to incomplete combustion undeveloped heat CO, H_2, CH_4, etc.	0
VIII	Developed heat of CO	0
IX	Heat from fuel to supplement heat from cooler (XXXVI)	0
X	Heat in dry products of comb. (high level heat above 1525° F)	13135
XI	Heat of fuel to heat all gases, 1525° to calcining zone terminal temp.	0
XII	Heat of fuel available to calcining reaction and charge superheating	13165
XIII	Heat of superheat calcined charge to beginning of exothermic reaction	4500
XIV	Total of high temperature level heat applied to calcination reaction	8665
XV	Sensible heat in preheated MgO portion of charge at 1525°	136
XVI	Sensible heat in preheated CaO portion of charge at 1525°	4108
XVII	Sensible heat of argillaceous and extraneous of charge at 1525°	2411
XVIII	Total sensible heat of calcined charge at 1525°	6655
XIX	Sensible heat at beginning of cement forming exothermic reaction	11155
XX	Heat of exothermic reaction of the clinker zone combinations	4197
XXI	Total heat of cement clinker at maximum developed temperature	15352
XXII	Sensible heat of cement clinker at kiln discharge temperature	11155
XXIII	Sensible heat of clinker to fuel and gas stream of kiln	4197
XXIV	Sensible heat recovered using recirculated exhaust gases	0
XXV	Sensible heat lost from lines recirculating exhaust gases	0
XXVI	Net sensible heat recoverable from recirculating exhaust gases	0
XXVII	Sensible heat recovered from recirculating exhaust gases in cooler	0
XXVIII	Sensible heat remained in cooling clinker with recirculating gas	5577
XXIX	Sensible heat remained in cooling clinker with air of combustion	5578
XXX	Sensible heat lost through non-recuperative cooling of clinker	0
XXXI	Heat gain with cooling air being above basic temperature	0
XXXII	Heat loss due to venting of cooler air or gas streams	0
XXXIII	Sensible heat remained through recuperative cooling of clinker	11155
XXXIV	Heat retained by preheating fuel with exhaust gases	0
XXXV	Total heat recovered from clinker and recirculating exhaust gases	15352
XXXVI	Heat from cooler to total kiln gases up to 1525° (low level heat)	4450
XXXVII	Heat of pre-heats of combustion and recirculating gases at 1525°	4450
XXXVIII	High level heat above 1525° from combined air and recirculating gases	10902
XXXIX	Heat from cooler to kiln gases 1525° to calcining zone terminal temp.	3098
XL	Heat from recuperatively cooled clinker to calcining reaction	7304
XLI	Sensible heat of kiln gases 1525° to calcining zone terminal temperature	3598
XLII	Total heat of kiln gases at calcining zone terminal temperature	8048
XLIII	Heat to $CaCO_3$ calcining reaction due to differential at high temperature	759
XLIV	Heat of exothermic reaction of conversion of kaolinite to kaolin	257
XLV	Heat of calcination reaction of $MgCO_3$	308
XLVI	Heat of $MgCO_3$ calcining reaction due differential at high temperature	39
XLVII	Total heat applied in $MgCO_3$ calcining reaction	347
XLVIII	Total heat applied to dehydration of kaolinite	504
XLIX	Latent heat of vaporization of free moisture in charge	0
L	Heat to $CaCO_3$ calcining reaction (high temperature level reaction)	14718
LI	Heat of $MgCO_3$ calcination, evaporation, dehydration (low temp.reactions)	901
LII	Total of all heat applied to all reactions in cement kiln	17619
LIII	Sensible heat of preheating CO_2 component of kiln charge	3576
LIV	Sensible of CO_2 from $CaCO_3$ to kiln gases	3576
LV	Sensible heat of preheating CO_2 component of $MgCO_3$	96
LVI	Sensible heat of CO_2 from $MgCO_3$ to kiln gases	96
LVII	Sensible heat of preheating H_2O component of kaolinite	163
LVIII	Sensible heat of H_2O from kaolinite to kiln gases	163
LIX	Total of sensible heat loss and latent heat of H_2O in charge	0

is a loss equivalent to 500 tons of clinker, or 100 percent loss on the basis of output.

Considering the ratio of low-temperature level to high-temperature level heat requirements, or the ratio of endothermic to exothermic, any heat saved in a cement kiln will make clinker at the rate of 262,000 Btu. per barrel of clinker provided, of course, the heat saved at one end of the kiln is not lost at the other end.

A lime kiln has a preheating zone and a calcining zone. A cement kiln has one or more additional zones which overlap, and this is as detrimental as anything to both thermal performance and capacity. Due to this "zonal overlap," material inadequately dried enters the preheating zone, inadequately preheated material enters the calcining zone and, worst of all, that inadequately calcined material enters the clinkering zone. In cement kilns this is a critical zone, and any excessive uncalcined material limits its exothermic functions and development of proper sort of clinker by cooling the beds.

The hot gases that should have been calcining carry over into the preheating zone and then into the vaporizing zone. The gases that should have done the drying go to waste at a temperature 1,000 deg. F. higher than they should.

Schematic part A of the consolidated Fig. 2, features the Azbe Concept of a cement clinker kiln system in its basic principle. The graph B presents the temperature gradients and CO_2 content of the various zones. The flow diagram C presents the various heat circuits on the basis of 100 percent thermal efficiency of which 70 percent or even more should eventually be realized.

Sketch A shows how the separate reactions and heating processes would be confined to their respective zones, temperatures lowered and terminal heat losses of each zone reduced through the improvement in heat transfer.

The boundaries of all zones are segmented. Segments present many heat transfer advantages; they increase the area of the surfaces to which the gases may transfer the heat and the areas from which the material may absorb the heat. The material becomes better and more frequently exposed, and the gas stream is divided and brought closer to the charge. The aim is not complete kiln segmentation, but segmentation of strategic parts of the kiln where something special is to be gained —where heat transfer is the least or bed reaction is sluggish.

Each segmented section has a three-fold pur-

pose. For example, section D aids in terminating the preheating action. Otherwise this would be long delayed, and it aids incipient calcination. Throughout the kiln there would be a lowering of the mean temperature as well as terminal temperatures of the individual zones. The result would be to greatly reduce the exhaust temperature of the kiln, raising its capacity and thermal efficiency.

Chart B presents the likely material temperatures and gas temperature ranges for such a kiln. The very rapid material temperature rise and the rapid cooling of the gases within the segmented sections as compared to the open section should be noted. The gas temperature is far less than of normal cement kiln where the exposure of the material is poor. While much heat is developed, the absorption surfaces are limited and there are no fully effective heat transfer surfaces present, only the surfaces of the charge itself and the heat-wasting brick surface of the kiln wall.

An efficient cement kiln, however, presents problems that tend to limit its efficiency. Some of these problems appear insurmountable. The clinker at the kiln discharge is very hot. It embraces the sensible heat abstracted by the calcareous and argillaceous components in the preheating zone, the superheat acquired in the calcining zone, plus the heat of the exothermic reaction. For the kiln to be efficient it is necessary for this heat to be recovered and returned to the kiln. If it is not returned, the kiln is less efficient and may be considerably less efficient because the value of such regenerated heat as a calcining medium is higher than of the heat of the fuel. It is all heat of high elevation, all available to the basically essential purpose of calcination.

There is more to this than is ever realized. If sensible heat is lost at the cooler, other heat is lost at the kiln feed end, and still other through the the kiln walls and all for the reason of the initial loss. That exhaust gases are so hot is not only due to poor surfacing of the kiln charge, but to non-regenerative cooling of the clinker as well.

Supposing we assume an efficient cooler recovering 90 percent or better of the heat of the clinker. This cooler would lead to a more efficient kiln, which would bring still more clinker to the cooler. But the more clinker produced per pound of fuel, the less air is available for the cooling of the clinker. It so happens that if a cement kiln is efficient, there is not enough air available to cool the clinker, even in the case of a perfect cooler, and even if all of the air of combustion would pass through

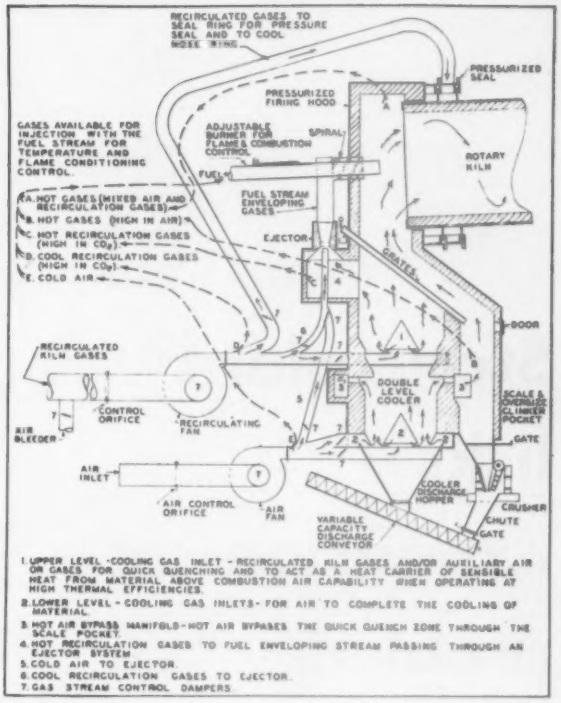

RECIRCULATED GASES TO SEAL RING FOR PRESSURE SEAL AND TO COOL NOSE RING
PRESSURIZED SEAL
PRESSURIZED FIRING HOOD
GASES AVAILABLE FOR INJECTION WITH THE FUEL STREAM FOR TEMPERATURE AND FLAME CONDITIONING CONTROL.
ADJUSTABLE BURNER FOR FLAME & COMBUSTION CONTROL
SPIRAL
ROTARY KILN
FUEL
FUEL STREAM ENVELOPING GASES
A. HOT GASES (MIXED AIR AND RECIRCULATION GASES)
B. HOT GASES (HIGH IN AIR)
C. HOT RECIRCULATION GASES (HIGH IN CO2)
D. COOL RECIRCULATION GASES (HIGH IN CO2)
E. COLD AIR
EJECTOR
GRATES
DOOR
RECIRCULATED KILN GASES
CONTROL ORIFICE
RECIRCULATING FAN
AIR BLEEDER
DOUBLE LEVEL COOLER
SCALE & OVERSIZE CLINKER POCKET
GATE
AIR INLET
AIR CONTROL ORIFICE
AIR FAN
COOLER DISCHARGE HOPPER
CRUSHER
CHUTE
GATE
VARIABLE CAPACITY DISCHARGE CONVEYOR
1. UPPER LEVEL - COOLING GAS INLET - RECIRCULATED KILN GASES AND/OR AUXILIARY AIR OR GASES FOR QUICK QUENCHING AND TO ACT AS A HEAT CARRIER OF SENSIBLE HEAT FROM MATERIAL ABOVE COMBUSTION AIR CAPABILITY WHEN OPERATING AT HIGH THERMAL EFFICIENCIES.
2. LOWER LEVEL - COOLING GAS INLETS - FOR AIR TO COMPLETE THE COOLING OF MATERIAL.
3. HOT AIR BYPASS MANIFOLD - HOT AIR BYPASSES THE QUICK QUENCH ZONE THROUGH THE SCALE POCKET.
4. HOT RECIRCULATION GASES TO FUEL ENVELOPING STREAM PASSING THROUGH AN EJECTOR SYSTEM
5. COLD AIR TO EJECTOR.
6. COOL RECIRCULATION GASES TO EJECTOR.
7. GAS STREAM CONTROL DAMPERS

Figure 4 Double-level quick-quench rotary kiln cooler

the cooler. So if the kiln is efficient, one cannot cool the clinker, and if the clinker is not regeneratively cooled, the kiln cannot be efficient, and we reach an impasse.

With the lime kiln it is different, where we only have the sensible heat of the discharging lime. In cement kilns there is also the sensible heat of the argillaceous component and the heat of the exothermic reaction of cement clinker formation. If both the lime and the cement kilns could be operated at 100 percent thermal efficiency, the first would give 9.61 lb. of 95 percent CaO and the second 18.87 lb. of clinker. At other efficiencies, the weights would be in proportion. Since the discharging clinker tends to be hotter than lime, the heat content of the clinker will be well over twice that of lime and legitimate air will be insufficient.

Diagram C of Fig. 2, features heat streams for an ideal cement kiln. It is a simplified presentation of the heat balance diagram of Fig. 3. The careful study of diagram C reveals that the heat from the cooler is more than the heat from the fuel and reveals also why this seeming impossibility may exist.

If we assume theoretically perfect lime and cement kilns, and allow all air of combustion to pass through the coolers with no excess air in either case, then for lime the resulting air temperature

Please turn to page 129

Cave Stone Co.'s

Stone plant licks expansion-cost problem

Big quarry truck near the end of its quick 400-yd. run from quarry to primary jaw crusher

WHAT'S THE BEST WAY TO EXPAND production and still minimize investment for new equipment? Cave Stone Co.'s solution to the problem might be your answer. This Flat Rock, Ind., crushed stone firm did the trick by upping quarry production from 125 to 250 tph. and storing the extra stone, for use by the processing plant at night when the quarry is shut down.

Cave Stone's superintendent, Walter Van Gorden, found that the demands of his market were outgrowing his plant. Cave Stone operates in a largely rural area in south central Indiana. The firm has prospered, supplying about 150,000 tpy. of stone to Shelby County for road jobs, to private industry for concrete aggregate and to farmers for agricultural limestone.

The problem: To boost production at minimum cost. These two facts had to be considered in any expansion program:

—Superintendent Van Gorden preferred not to work the quarry two shifts. Shovel and truck-operator wages are quite high, and second-shift rates would be even higher. Even more important here, excess shovel and primary-crusher capacity

solution might be your answer, too

Standing atop 8-ft. reclaim tunnel in a corner of the quarry, Sup't. Walter Van Gorden points to primary crusher house. Impactor is in right center; new horizontal primary screen is now in place above the two new load-out bins, left

was already available as a result of a lengthening haul in the quarry. Only more haulage-truck capacity was needed.

—It would be possible to work the plant itself for two shifts during peak periods, doubling daily capacity. The plant would not be so difficult to illuminate for night-shift work as the sprawling quarry operation. Thus hourly capacity rating of the plant itself wouldn't have to be raised to increase daily output 100 percent. Doubling per-hour capacity of the processing plant would mean purchase of many costly equipment items.

The solution: To purchase two 15-ton rear-dump haulers, thereby increasing the combined capacity of its old units (one 6-ton, one 10-ton truck) about 100 percent. The plant's existing 1½-cu. yd. shovel and 30 x 42-in. primary jaw crusher can handle the doubled load nicely.

Next, a way had to be found to store the 125-tph. extra first-shift quarry production for use at night. This was neatly solved by inserting a horizontal screen, truck bins and a big surge pile between the primary and secondary crushers.

Now the entire 250-tph. flow from the primary crusher goes to the 3 x 12-ft. horizontal triple-deck screen. This busy unit scalps off plus 1¼-in. stone, sending it to a big surge pile nearby. When orders come through for clay-free stone of any size, a reclaim conveyor pulls the plus 1¼-in. material out and up to the secondary impactor. The plant also draws on this pile of plus 1¼-in. stone during the second shift. A vibrating feeder in the reclaim tunnel insures a steady flow.

To make the surge-reclaim system was not difficult. A big corrugated-steel pipe, 8 ft. diam., was placed on the quarry floor near the plant. Just three conveyors were added to complete the new system: One moves the full quarry production from primary crusher to horizontal screen. A second travels from screen to surge pile, and the third leads from surge pile to the secondary 30 x 30-in. twin impactor.

Cloth sizes on the horizontal screen are 8 mesh, 1¼ in. and 2 in. The 8 mesh by 1¼-in. fraction, called No. 63 stone, is dropped to truck bins newly placed beneath the screen. Good for secondary roads and base courses, this product is in strong demand. It is stored both in the load-out bins and

Cave Stone *continued . . .*

ground storage piles. The minus 8-mesh product sells well as coarse agricultural lime.

These well-planned improvements give Superintendent Van Gorden several advantages over the old setup, beyond just more daily capacity at minimum cost. First, by separating large stone from the smaller sizes which contain bits of clay, he can for the first time make a specification concrete stone. All that's necessary is to crush the large fraction in the original plant. Previously the clay was left in the stone, which contained enough of this impurity so that it was little used for concrete aggregate.

But that's not all. By mounting the new horizontal screen above truck load-out bins, Mr. Van Gorden now can ship the popular 63 size directly. There's no need now to wait for this size to travel through the entire plant, taking valuable belt space, crusher and screen capacity.

Process flow is straightforward in the original plant. In the quarry, a 3-in. wagon drill, mounted on a wheeled farm tractor for portability, pushes down 10-ft. holes. After a blast (using four parts 60-percent dynamite topped by three parts 40-percent), the power shovel takes over. It loads the two quarry rear-dumps which then make the 400-yd. run to the primary crusher.

This is the primary processing end of the plant, with its jaw and impactor breakers, plus new tunnel and horizontal screen arrangement. From the impactor, first piece of equipment in the secondary section, the main belt runs up to a 4 x 12-ft. triple deck screen. Mounted above a low-cost, wood load-out bin, the screen makes size separations at 8 mesh, 1¼ in. and 2 in.

Minus 8-mesh coarse aglime has been stored as a finished product in the wood bin. When full, the compartment for agstone is emptied, and the excess trucked a short way to ground storage.

The 8 mesh x 1¼-in. fraction off the triple-deck screen is conveyed to a final screening tower. When 2 x 1¼-in. stone is sent to the 3-deck screen, it drops to a rumbling 22 x 40-in. roll crusher. After reduction, the stone is minus 1¼ in. and it joins the minus 1¼-in. stream leading to the final screening tower. Plus 2-in. stone is scalped off the triple-deck screen and chuted down to a 30 x 30-in. hammermill. After crushing, a bucket elevator recycles it to the big triple-deck screen above.

At the final screening tower, two 3½ x 10-ft. twin-deck screens at the top, size the 8 mesh x 1¼-in. material. Separations are made at 4 mesh and ¾ in. The smallest product, 4 x 8 mesh, is sold as coarse lime or fine aggregate. The ¾ in. x 4-

Over-all view taken before installation of new surge system now in place at right rear. Primary crusher is in white building, center rear; secondary impactor, to its left

mesh fraction is No. 9 stone, widely used for secondary roads and private construction. And the 1¼ x ¾-in. fraction makes No. 4 stone, also in use as a coarse aggregate. All three sizes are stored in the three compartments of the two truck load-out bins beneath the screens, with excess going by truck to ground storage.

A full 30 percent of Cave Stone's sales are in minus 8-mesh agricultural limestone, and a steady stream of farm tractor-trailers and stake trucks invades the plant to get the soil conditioner.

Here's where a profit-boosting piece of material-handling equipment comes in. Not long ago Cave Stone used a ¾-ton tractor-shovel and a bucket loader for scooping ground-stored stone into delivery trucks. The loader was of only 1-cu. yd.-per-min. capacity—rather small for today's 6 to 10-ton capacity delivery trucks. And the tractor shovel had two weaknesses—too-small capacity and inadequate lift and reach to fill quickly the trucks arriving at the plant.

But a new 2-cu. yd. unit has solved all three problems. First, it has 50 percent more capacity than the two units it replaces. And it requires but one operator, an important saving. Second, its greater lift and reach mean balanced loads on 10-ton trucks. The ¾-ton unit could not manage this safely. Because of its ability to travel quickly, the 2-cu. yd. rubber-tired tractor-shovel scurries from one end of the plant to the other, loading out various sizes of stone. **END**

MAJOR EQUIPMENT REFERENCE

Quarry operation:

Power shovel, 1½-cu. yd. ..... Northwest Engineering Co.
Stripping shovel, ¾-cu. yd. ..... Thew Shovel Co.
Quarry rear-dumps, 15-ton (2) ..... Euclid Div., GMC
Air compressor, 600 cfm. ..... Le Roi Div., Westinghouse Air Brake Co.
Drill rig, 3-in. wagon ..... Joy Mfg. Co.
Explosives ..... E. I. DuPont de Nemours & Co.; Trojan Powder Co.

Primary plant:

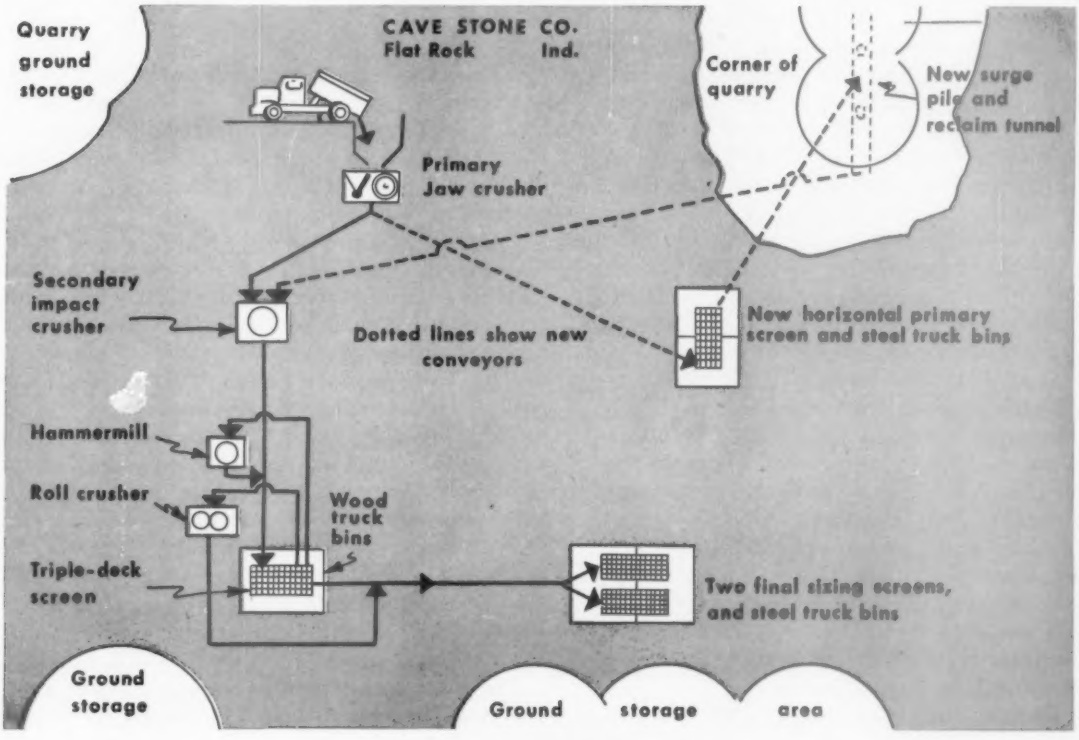
Primary crusher, 30 x 42-in. jaw ..... Lippman Engineering Works
Primary screen, 3 x 12-ft. 3-deck ..... Lippman Engineering Works
Truck bins, 21-cu. yd. (2) ..... Pioneer Engineering, Div. of Poor & Co.
Vibrating feeder ..... Syntron Co.

Secondary plant:

Impactor, 30 x 30-in. twin shaft ..... Iowa Mfg. Co.
Second screen, 4 x 12-ft. 3-deck ..... Pioneer Engineering
Roll crusher, 22 x 40-in. ..... Pioneer Engineering
Hammermill, 30 x 30-in. ..... Gruendler Crusher & Pulverizer Co.
Final screens, 3½ x 10-ft. (2) ..... Iowa Mfg. Co.

General:

Conveyors ..... Pioneer Engineering; Lippman Engineering Works
Tractor shovel, 2-cu. yd. ..... Tractomotive Corp.



New York Trap Rock's new West Nyack stone crushing plant

by Elwood Meschter

Rather than stepped up production, New York Trap Rock boasts above-par safety features and improved operational efficiency

New goals earmark rebuilt plant

LIKE THE PHOENIX, a mythological bird born of its own ashes, the new crushed stone plant of New York Trap Rock Corp. sprang out of the debris of an old one. The old plant at West Nyack, N.Y., was demolished in December, 1957; the new one was in production by May, 1958.

Safety and operational efficiency, rather than increased production, were the company's goals—at 250 tph., the new edition's capacity is not much greater than the old plant's. But the new buildings, constructed of reinforced concrete and structural steel, are completely fireproof, and the plant now has the flexibility to make nine sizes of finished material. Dust collection and preventive maintenance are two more features that make the operation outstanding among crushed stone plants.

For safety's sake, conveyors that cross over roadways are protected with full-length skirt boards. As an additional precaution, the walkways are fitted with heavy-gauge hardware cloth to hold stone that might evade the skirt boards. Substantial walkways along conveyors and stairs in the screen houses provide easy access to machinery for maintenance and inspection.

For cleaner performance, each of the three screening towers is fitted with a large-capacity dust collector. Ductwork takes dust from hoods over each vibrating screen to the collector. Eventually, each screen will be totally enclosed to make dust collecting even more efficient.

Since the plant has only recently gone into full production, the preventive maintenance program is not yet in full swing. Its object will be to help prevent accidents and breakdowns of machinery and equipment. Periodic inspections and servicing of trucks, shovels, conveyors, crushers and motors will be recorded.

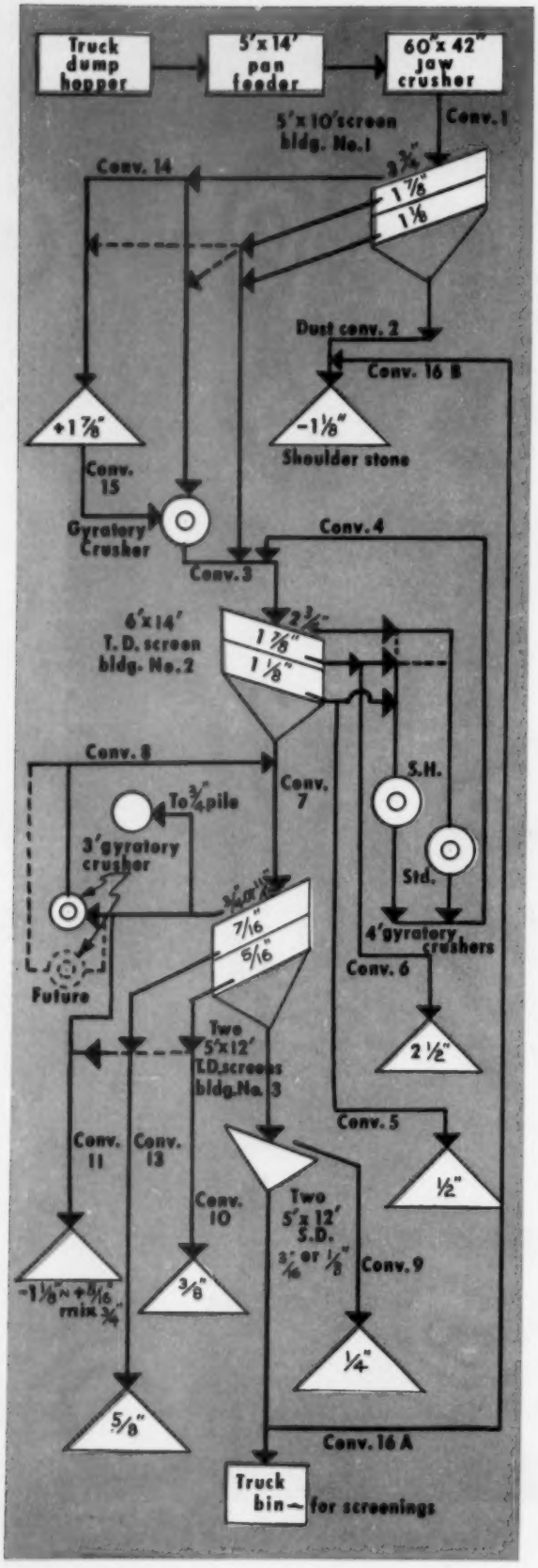
An essential part of the program will be a standard recording system which will accumulate the man-hours and expenses involved in the repair and replacement of each piece of equipment. These records will provide data for analyzing and systematizing future maintenance.

Trap rock occurs at West Nyack as a steel-grey, fine-grained dibase intrusion into a sandstone formation. Blasting brings down the 50-ft. face of the vertical seams into sharp, heavy blocks which are then loaded out with a 2½-cu. yd. shovel. A fleet of four 18-ton rear-dump trucks hauls the rock to the 60 x 42-in. primary jaw crusher.

Flexibility starts at the No. 1 screen tower with a 5 x 10-ft., triple-deck screen. The top deck scalps off plus 3¾-in. stone for a surge pile ahead of a 16-50 secondary gyratory crusher. A chute permits this oversize to be diverted directly to the crusher. The second deck of the screen has a similar chute arrangement to send plus 1⅞-in. stone to a surge-pile conveyor, to the crusher or on through the system, by-passing the crusher.

The lower deck separates the 1⅞ x 1⅛-in. fraction from the fines. Although the minus 1⅛-in. size

This maze of conveyors yields exceptional materials handling efficiency



Crushing plant *continued . . .*

contains traces of overburden from the quarry, it includes plenty of good stone and is a salable product known as "shoulder stone."

Vibrating feeders under the plus 3¾-in. surge pile draw the heavy stone down to a belt conveyor to carry it to the secondary crusher. All crushed rock is conveyed from the No. 1 crusher building to the top of building No. 2.

In this building, a complex arrangement of chutes under a 6 x 14-ft., three-deck vibrating screen permits complete flexibility. Either one of two 4-ft. cone crushers can receive stone from either or both of the two top decks. Stone from the lower deck can go to one of the crushers. All crushed material is recycled back to the top of the screen.

Normally, the upper deck takes out plus 2¾-in. stone, and the middle deck makes minus 2¾-plus 1⅞-in. material. The latter fraction can be sent to storage as an alternative to crushing. Stone from the lower deck, usually 1⅞ x 1⅛ in., can also be conveyed to storage.

Through-screen materials, the crusher fines, are conveyed to building No. 3 where four more vibrating screens make five widely ranging sizes. The conveyor splits its discharge between a pair of 5 x 12-ft., three-deck screens. Another chute complex controls the output from the two upper decks.

The top deck can be readily changed to make either two finished products or a crushed product to be recycled. One product is plus ¾-in. stone; the other is a blend of material from all three decks known as "¾ mix." The middle deck is usually set at 7/16 in. and the lower at 5/16 in.

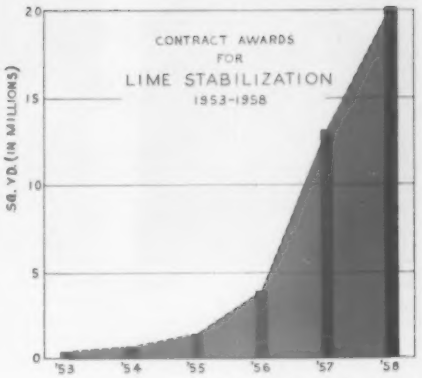
Minus 5/16-in. fines drop to a pair of 5 x 12-ft., single-deck vibrating screens that scalp off plus 3/16 or ⅛-in. stone. Through-screen material is dropped to a truck shipping bin or is transported back to the shoulder-stone pile by conveyor. END

MAJOR EQUIPMENT REFERENCE

Drill	Ingersoll-Rand Co.
Shovel, 2½-cu. yd.	Bucyrus-Erie Co.
Trucks, 18-ton (4)	Euclid Div., GMC
Jaw crusher, 60 x 42-in.	Farrel-Birmingham Co., Inc.
Vibrating screens	Allis-Chalmers Mfg. Co. Hewitt-Robins Inc.
Gyratory crushers	
16-50	Allis-Chalmers Mfg. Co.
3-ft. shorthead	Nordberg Mfg. Co.
4-ft. standard	Nordberg Mfg. Co.
4-ft. shorthead	Nordberg Mfg. Co.
Dust collectors, Multiclone (3)	Wheelabrator Corp.
Conveyors	Stephens-Adamson Mfg. Co.
Motors	Allis-Chalmers Mfg. Co.
Plant design	Eastern Engineering Sales Co.

National Lime Association reports show this new stabilizing agent for roads is the industry's fastest growing market

Lime stabilization grows sharply



Courtesy National Lime Assoc.

USE OF LIME AS A SOIL STABILIZING AGENT is the fastest growing market the lime industry has. And it's going to continue to grow. Hydrated lime reached a peak in 1958, when awards soared to 20.1 million square yards for roads, airport runways and parking areas. This work represents a 33-percent increase over 1957, and involved the use of 240,000 tons of lime.

These facts were highlighted at the 57th Annual Convention of the National Lime Association in Hot Springs, Va., April 6-8. Also, a review of 1958 showed that it was a fair year all around for lime, despite several weighty problems the industry had to shoulder. Resurgence of the steel industry back to high production figures helped the industry to adopt a more optimistic attitude.

The group re-elected M. A. Rikard, Southern Cement Co., Div. of American-Marietta Co., as its president for the next year. This will be his fourth consecutive year in that responsible position. John M. Junkin of the Warner Co. was named vice president; Reed C. Bye, also of the Warner Co., was named treasurer, and Robert S. Boynton was renamed general manager. Georgia M. Coffman was elected secretary. The offices of vice president and secretary are new for the following year.

Lime stabilization has grown like topsy in the last couple of years. In fact, it is the only use of lime that has shown growth in the period, and the industry is pretty excited about it.

The Association's excellent movie on the subject has done much to foster a growing interest. It has been shown about 325 times, all over the world, mainly to highway groups. NLA estimates that some engineers from 40 different highway departments have now seen the film.

So hot is the development, the Washington staff has devoted more time to it than to any other subject. And still they can't keep up. Manpower is becoming a big problem, since more and more lime jobs are showing up. One fear is that the potential market may suffer unless proper advice on good construction procedures is made available. In that connection, NLA is now preparing a treatise on the best procedures to be used in lime stabilization. This work is expected to be published soon.

Progress to date in lime stabilization was covered by Conard M. Kelley, NLA's highway engineer. Through work of the Association and the industry, engineers, Army and Air Force officials and highway people are now pretty well informed on lime stabilization work. Word on the process has gotten around to men in high places, who are helping to boost it. Federal and State agencies, national associations and contractors are using or studying the use of lime for stabilizing foundations, roads and streets, subgrades under highways, airport runways and shoulders and many other uses.

Research work on lime and clay mineralogy is in progress at the University of Illinois, to gain more information on why lime actually reacts as it does with soils. Dr. Ralph E. Grim, Dept. of Geology, U. of I., reported on some of the results already obtained. He has X-rayed and diagrammed clay minerals to study their physical structure so further study can be made of their chemical properties. He found that aggregates of crystalline min-

Durox, a lightweight cellular concrete, was brought to this country by Karl Lagnefors

New NLA safety awards honoring 2,000-day and 3,000-day accident-free plants were accepted by (left to right) J. S. Offutt for U. S. Gypsum Co., and Paul Sunderland for Ash Grove Lime & Portland Cement Co.; K. A. Gutschick holds 2,000-day certificate awarded to Dow Chemical Co.

Improvements in vertical kilns have resulted in a better product and increased daily output at Ashtabula—D. E. Stingel

National Lime *continued . . .*

erals are arranged in a definite pattern in relation to other materials. Additional study will show, he said, an ability to predict on the basis of the clay minerals composition what problems of stabilization may be met.

What happens when you add lime to soil? That's the question that has plagued James L. Eades for a long time. Finally, he and NLA got together, and he became a Research Fellow at the University of Illinois so he could try to find the answers that both wanted. Much valuable information on lime in clay mineralogy has been collected. "We're building guideposts for future work", he said.

Outstanding safety achievement in the lime industry was recognized at this meeting by presentation of new awards. One lime plant in the industry has scored the amazing record of 3,336 days of operation without a lost-time accident. A special 3,000-day award, authorized by NLA at its last winter meeting, was presented to Mr. Paul Sunderland of Ash Grove Lime and Portland Cement Co. for this excellent record set by his company's Springfield, Mo., plant. Two 2,000-day certificates were presented to plants that had passed that mark in accident-free days. They are the New Braunfels, Texas, plant of the U. S. Gypsum Co., and the Ludington, Mich., plant of Dow Chemical Company.

Results of the 1958 lime plant safety competition were announced at the meeting by K. A. Gutschick of the NLA Washington staff. Class A1 winner was the U. S. Gypsum Co. plant at Genoa, Ohio, with 404,154 manhours. Winner in class A2 (quarry with calcining plant working less than 100,000 manhours) was the Tooele, Utah, plant of Marblehead Lime Co. with 57,822 manhours. Class B includes underground mines with lime plants. Winner in that class was the Peerless rotary plant, Ste. Genevieve, Mo., Mississippi Lime Co., 277,927 manhours. The Thornton, Ill., plant of Marblehead Lime Co. won the class C award (calcining plant only) with 145,855 manhours.

Recent major improvements in vertical lime kilns installed at Union Carbide's Ashtabula, Ohio, plant have resulted in a much better lime product. Donald E. Stingel, production manager of Union Carbide Olefins Co., Div. of Union Carbide Corp., described the changes. Output capacity of the three kilns had been increased over the past several years from an original rating of about 100 to more than 450 net tons of lime per day per kiln. But average core was higher than desired, since the kiln product was used mostly in electric furnace operations in the manufacture of calcium carbide. Changes made in the last few months were designed to improve the product so as to reduce the electric power consumed in the carbide furnaces. Daily output of each kiln has been kept above 450 tons while lime product has been improved.

Based on the results obtained in the improved shaft kilns at Ashtabula, Mr. Stingel made some revealing comparisons with rotary lime kiln production. Advantages in favor of the vertical kilns include those of fuel consumption, direct labor costs, maintenance and in capital cost per net ton of installed daily capacity.

Liming ponds and lakes may increase the yield of fish. This is particularly true for ponds, but there's still some doubt about lakes. Dr. W. R. Schmitz, Dept. of Hydro-Biology, University of

Lime stabilization's growing so fast that some new problems are cropping up—R. S. Boynton, NLA general manager

Visitor from abroad, L. B. Ryder (right), Imperial Chemical Industries, England, chats about kiln improvements with Donald E. Stingel

Dr. Ralph E. Grim discussed results of research work on lime and clay mineralogy

Wisconsin, who has done much research work on the subject, reported some results of that work.

The reason to lime ponds is to release nutrients already present in the water and, thus, to increase the yield of meat protein in the form of fish. He compared ponds and lakes to pastures. Grass of the lake is called plankton. Cattle are plankton-eating fish like minnow, carp and young panfish. "Tigers" that prey on the "cattle" are the highly prized bass, large trout and pike. Research reveals that the yield of "aquatic tigers" can be increased with the proper use of lime in ponds.

Dimensional changes in expansion of masonry walls involve many variables. Research based on one year of tests show expansion to be in the order of $\frac{800}{1{,}000{,}000}$ of an inch per inch, which is not considered to be harmful now. But if it continues to increase in the years ahead, it may become harmful.

R. L. Blaine, National Bureau of Standards, discussed the series of tests made by the Bureau. He specifically pointed out that any study such as this must take into consideration both horizontal and vertical expansion. Tests were based on the use of two types of mixes (1:1:6, 1:2:9) with several types of brick under several different conditions. These factors were found to have an effect on volume changes in masonry: (1) type of brick, (2) type of mortar, (3) storage conditions, (4) loading, (5) autoclaving and (6) various combinations of these factors.

A relatively new use for lime in this country is in the manufacture of Durox, a lightweight cellular gas concrete. It is made from lime and cement in combination with finely divided siliceous materials such as flyash, sand, aluminum shale, ash or blast furnace slag. Aluminum powder is used as a foaming agent. The product is a homogeneous mixture of various silicates, calcium hydro-silicate being the primary component. Mr. Karl Lagnefors described the manufacturing process and showed a film of a Swedish plant.

Market research and sales psychology have a definite place in a specialized industry such as lime. In fact, the tendency to oversimplify principles of selling in business seems to exist more in industry sales than in other types. According to Dr. Bertrand Klass, an outstanding figure in applied social science research, Forbes Marketing Research, Inc., there's no difference in selling industrial products than tooth paste or soap. They're the same, since human beings are being sold; people behave along basic rules of their perception.

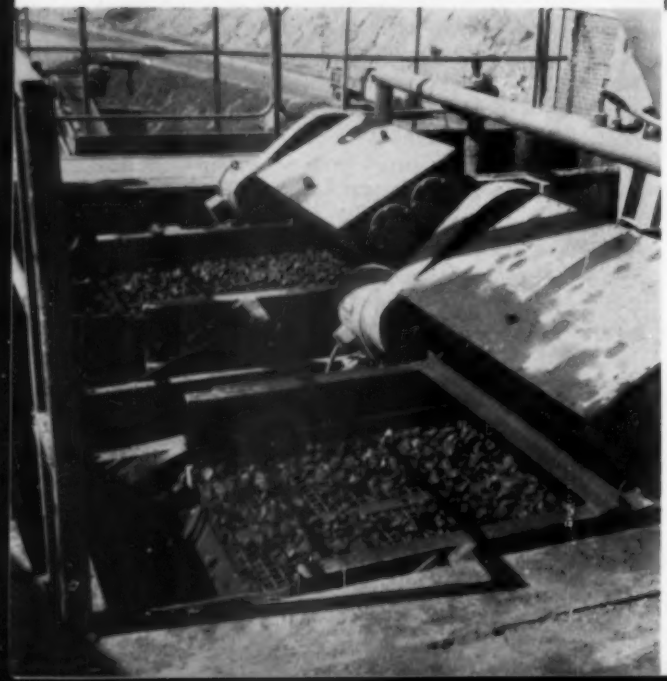
Although non-technical in nature as far as lime manufacture is concerned, Dr. Klass' forceful message was well received. He readily made the point that often sales attempts are made on the basis of what the salesman wants to sell, not on what the customer wants to buy. After pointing out the essential points for effective selling, he made the important point that sales and market research are separate functions, even though they are interdependent. The latter can be used to find answers to the questions concerning what customers want to buy. Then, the answers can be used for more effective selling.

Business and technical sessions were well attended, certifying the high interest of the varied program. Nearly 150 members, guests and ladies adjourned after the program until the 58th Annual Convention which will be held in 1960 at Sea Island, Georgia. **END**

Ingenuity

Log washers, two for gravel and one for sand, proved an effective solution to Caudell & Johnson's serious clay problem. The husky rabble arms have an effective slugging action

These screens, plus the sand wheels and log washers, are C & J-made. These two vibrators make final rinse after gravel leaves log washers



Above: Reclaim tunnels are of concrete pipe, and with good reason—they won't rust out as do steel pipes

by Walter B. Lenhart

Company-made log washers for fine and coarse aggregate play a vital part in cleaning the sand and gravel processed at the Mission Valley plant of Caudell & Johnson, San Diego

makes C & J a leader

BIG, EFFECTIVE COMPANY-MADE LOG WASHERS at Caudell & Johnson prove the aggressive, alert nature of this San Diego, Calif., sand and gravel producer. Just because their Mission Valley operation was running smoothly, John Caudell and Arthur S. Johnson were not necessarily satisfied with the plant. Best way to guarantee success was to keep one step ahead of competition and ever-tougher aggregate specs. First step was to install log washers and wet vibrating screens to replace rotary screens or trommels for removing clay.

Proof of Caudell & Johnson's aggressive attitude is their choice of equipment—it's largely of their own make. Being large, the firm can afford the "luxury" of large repair and construction facilities.

Final bit of evidence of C & J's inventiveness is its aggregates reclaiming setup. To cut labor costs and speed rehandling, reclaim tunnels were installed under a mid-plant surge pile and under the piles of finished product. This labor-saving feature has become the rule in new aggregates plants, and a good one too. But C & J went one step further. They now use big 87-in. concrete pipe for their tunnels instead of corrugated steel. The big advantage is that concrete doesn't rust out, lasts longer for them than steel units.

Log washers licked the crucial clay problem. Clean sand and gravel are essential with the tight concrete specs in force today. Here in a California Division of Mines report is a hint at the seriousness of C & J's problem: "The (San Diego area) conglomerate is composed of over 1,000 ft. of pebbles, cobbles and boulders in a brown silt, clay and sand matrix." The old trommels actually were quite effective, tumbling the gravel and sand, and rinsing out silt and clay at the same time. But the newer log washers and washing screens give the sticky clay a much tougher time. The units are longer than the trommels. The rapidly rotating paddles mix and scour the aggregate more positively, loosening the clay and making it easy to flush out.

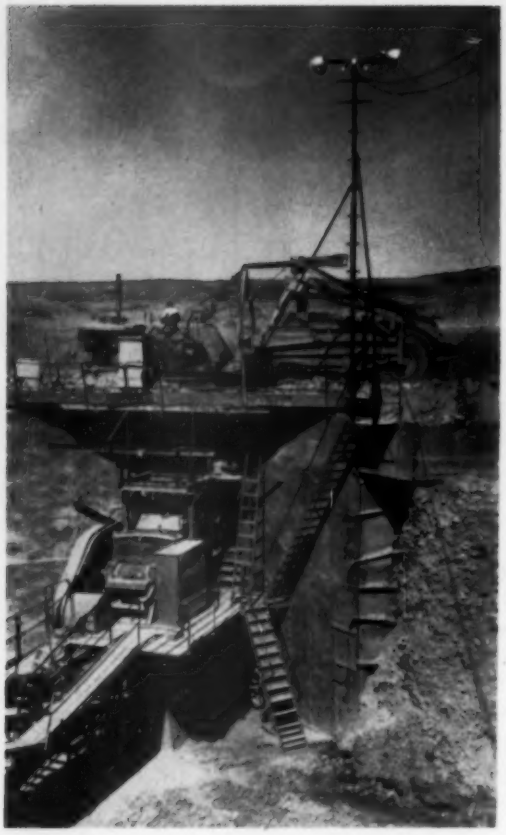
Both gravel and sand are run through log washers. The two big gravel units gobble up 275 tph. of minus 1½-in. material, cleaning it thoroughly. Then rinsing screens next in line rid the gravel of all clay. The two 4 x 23-ft. logs in each gravel unit, driven by a 150-hp. motor, have massive replaceable wear plates on the arms. Potent slugging effect of these big rabble arms is clearly the reason for their effectiveness. Being replaceable, the Ni-hard wear plates are quickly changed, minimizing valuable down-time.

The two single-shaft logs are really log washers, but the shafts are horizontal rather than inclined. About 65 tph. of dewatered sand get their final scrubbing here in each. Two 15 x 2½-ft. logs are fitted with replaceable rubber sleeves on their rabble arms—rubber for long life, replaceability for minimum down-time.

A high plateau is the deposit and the plant site. Half of the plant is atop the plateau where the deposit is worked, half in the valley below where shipping is done. When C & J built the Mission Valley plant back in 1950, they placed it on the edge of a vast deposit. In fact, much of the three million tons of sand and gravel produced in San Diego County each year come from this deposit.

Here's how the plant is laid out: The primary plant sits atop the plateau, near the edge. Here are the first two jaw crushers (20 x 36-in. and 15 x 38-in.) and the first sand washers (two sand wheels in series). Product from these machines moves steadily by belt to the big mid-plant surge pile, placed in the steep plateau side.

Excavation is by a new method now gaining



Scrapers both excavate and haul to primary plant atop big plateau at Mission Valley

Log washers *continued . . .*

favor in the gravel industry, used at the Mission Valley plant from the beginning—motor scrapers. Three husky 18-ton units, aided by a tractor pusher, both lift the aggregate from the ground and carry it to the plant. The bottom-dump units deposit the load in a hopper over the primary grizzly and crusher.

At the secondary plant downhill, C & J needed thorough washing and get it with the two log washers and two final-rinse screens for plus ¼-in. material; a dewatering wheel, the sand log and a double sand wheel for final rinsing. One of the now-popular liquid cyclones removes fines from effluent of the sand-processing equipment. Incidentally, C & J was the first gravel producer in the west to adopt wet cyclones.

After pulling primary-plant product from the surge pile, belts carry it to a 4 x 12-ft. scalping screen. Here a separation is made which sends fines down a sand pipe to the three sand washing rigs. Oversize goes a different route—to a 4½-ft. cone crusher and then a screen. Since some gravel is still oversize, it falls to a 54 x 20-in. roll crusher. All the gravel is now recombined on one belt.

Here it rises steadily on a wide belt to the two log washers, for the run through the grinding, rumbling 23-ft. unit. Because some attrition takes place here, two final-rinse screens are fitted with sand pipes. They direct the sand back to the sand equipment. Excess amounts of any size gravel can cause a problem. But not at Caudell & Johnson. A 4-ft. short-head cone crusher reduces the excess to the size desired, returns it to the main belt. Finished gravel goes by this belt to two final sizing screens, each over a reclaim tunnel. Stockpiling belts permit piling three sizes of gravel over each, making a total of six grades.

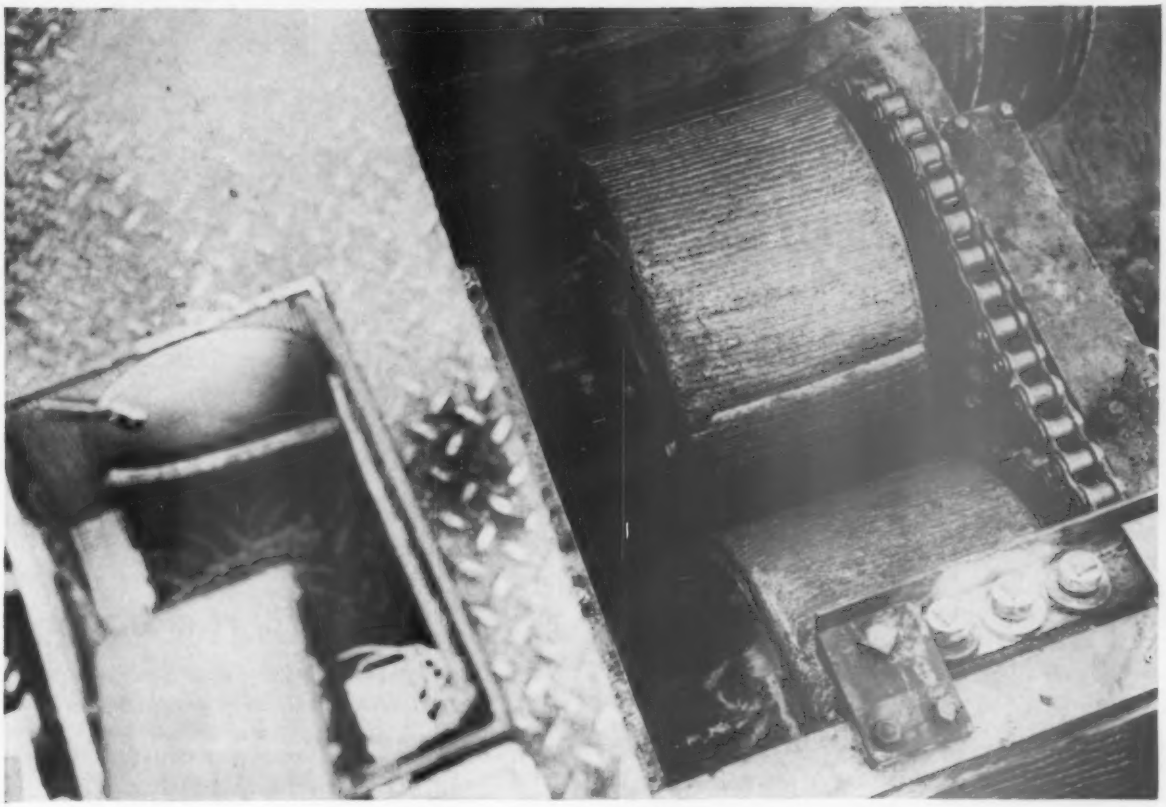
One final screen is an auxiliary unit. Placed in the recycle circuit of the short-head crusher, the screen permits ground storage, off to one side, of ⅜ and 5/16-in. crushed stone for special jobs.

Sand going through the dewatering wheel, sand log and double-rinse wheel is lifted by a swinging or radial stacker to the pile for finished sand. Three reclaim tunnels under the pile permit quick reclaiming.

Belts inside all the tunnels have idlers with side rollers inclined at 35 deg.; being cupped more than usual, these belts carry bigger loads than others during peak periods, C & J reports.

A complete aggregates and concrete testing lab at Mission Valley maintains quality checks on C & J's products. A recent addition to the lab's equipment is a compression-testing machine for checking concrete strength.

Caudell & Johnson has become a big and important producer in Southern California in recent years. Today the firm's aggregates operations produce in excess of 1,000 tph. The San Diego Transit Mixed Concrete Co. affiliate has modern batching plants and a large fleet of mixer trucks. The Southwest Structural Concrete Co., specializing in prestressed structural items, is a second important affiliate. Both are headquartered at the Mission Valley sand and gravel plant site. J. H. Caudell and Mr. Johnson are the owners of C & J. Robert Martin is engineer and Clifford Ward is superintendent of the Mission Valley sand and gravel operation. END



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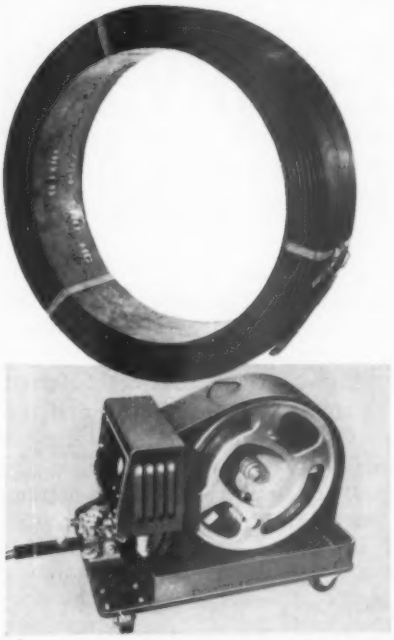

Stoody Semi-Automatic wires are available in a variety of alloy types for all job requirements. They can be fed through most standard semi-automatic welding machines.

Near Grants, New Mexico, a new super highway is under construction. Keeping crushers in operation to supply aggregate is a tough job. Roy Hartman, the welder, states, "I like to hard-face with the Semi-Automatic machine. On crusher rolls, I can lay down from 7½ to 10 pounds of Stoody 100 per hour but only about half that much when applying manual electrodes—even though working hard. Semi-Automatic hard-facing makes my job easier."

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What pitfalls do your contracts get you into?

To help you avoid possible legal pitfalls, here are some basic rules pertaining to business contract law

by Earl W. Mounce* and Robley D. Stevens**

IT CAN HELP YOU TO KNOW some basic facts about business contract law, including the definition of a contract, what a contract involves and when a contract must be in writing to be enforceable.

During the course of a year, you probably enter into hundreds of oral, implied or written contracts for the buying and selling of products. You may have incurred legal liabilities without knowing it, but you may also have created valuable rights for your business. You may put yourself at a great competitive disadvantage if you don't know the legal rights and obligations which are given and imposed by contract law; your company may even stand to lose plenty of money.

To protect yourself against making unnecessary contracts, you should understand the definition of a contract. Simply stated, a contract is a promise or set of promises for the breach of which the law gives a remedy, or the performance of which the law recognizes as a duty.

You are not compelled by law to enter into a particular business contract. If you should enter into such a contract, the rights and duties which you have under the contract will be derived from your "voluntary" agreement to it. The court will not make a contract for you. But if you and the other party voluntarily enter into a legally enforceable contract, the court will interpret and enforce it.

The contract-under-seal is the common example of a formal contract. It was the first type of contract to be recognized and enforced by the court. It had to be in writing, signed and sealed. Today, however, in a number of states the necessity for the seal has been abolished.

A contract is said to be an "express" contract if the parties to the contract expressly state the terms of the agreement. The intentions of the parties to a contract and the terms of the agreement may be in writing or entered into orally.

An "implied" contract is a contract inferred from the acts or conduct of the parties and the surrounding circumstances involved. The terms of the contract and the intention of the parties are not expressed orally or in writing, but the actions and conduct of the parties indicate an intention to contract.

You prove an "express" contract by introducing the written contract, or, if your contract was orally entered into, by introducing evidence of what the parties said.

You prove an "implied" contract by introducing evidence as to the acts of the parties.

Please turn to page 104

Five rules to remember:

1. Don't make business contracts unless you are willing to assume the outcome.

2. Don't sign any business contracts unless you know exactly what you are signing up for.

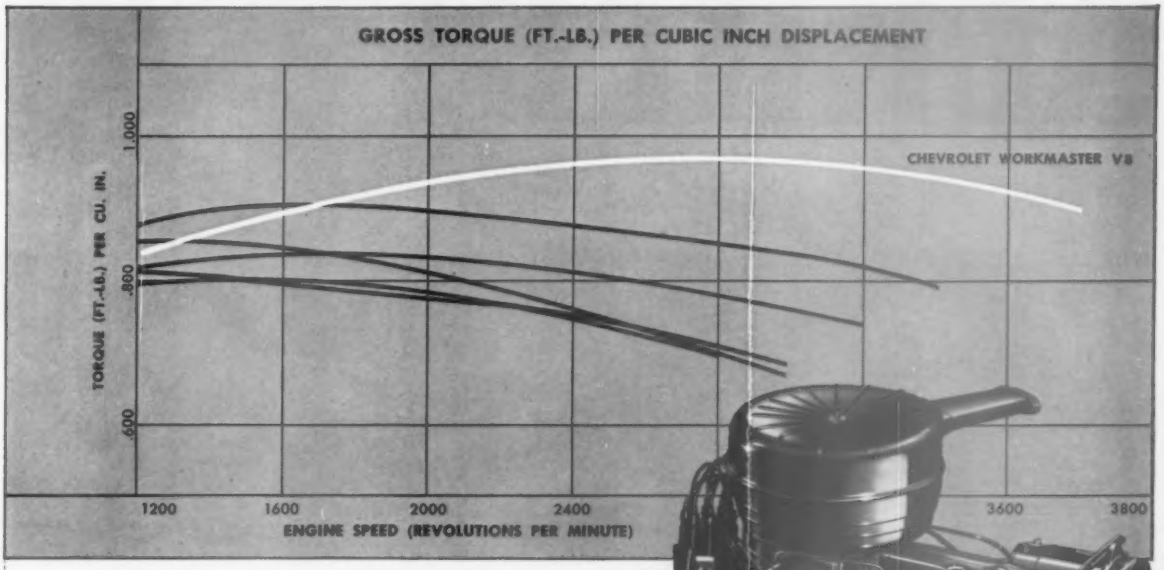
3. Know what a business contract is and what it entails.

4. Protect your company by avoiding legal mistakes.

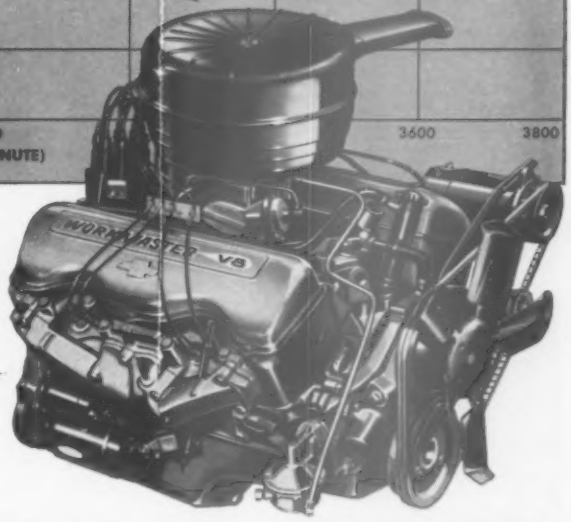
5. To be absolutely safe, consult with a competent attorney.

*Professor of Law, University of Maryland
**Management Consultant, Washington, D.C.

It's torque that beats tough jobs, and this engine has it to spare!



Proof that the Workmaster V8 puts out plenty of torque. The white curve above shows that the Workmaster provides high torque throughout the *entire range* of operating speeds. The black curves accurately represent the torque output of typical heavy-duty 6-cylinder engines of between 330 and 390 cubic inches of displacement. Curves demonstrate actual torque efficiency, based on gross ft.-lbs. of torque per cubic inch of displacement.



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It's torque that gives a truck plow-horse pulling ability at low speeds and assures the power to keep big loads moving, whether it's through the rough or over the road. And Chevrolet's 230-h.p. Workmaster V8 puts out a brand of torque that's made to order for your toughest big-tonnage hauls.

High torque output is the natural result of the Workmaster V8's unique design characteristics. Short piston stroke and large piston area, for example, comprise a torque-producing advantage, and *this engine provides the shortest stroke in its class.*

Advanced Wedge-Head design, with its fully machined combustion chambers, means high torque, too. It assures high turbulence of the fuel-air mixture and balanced power output from each cylinder. The Workmaster V8 has high volumetric efficiency . . . takes in the fuel-air mixture *efficiently* at all speeds. This, combined with a camshaft design that gives just the right valve lift and timing, assures high torque—extra pulling power to get you through the tough spots!

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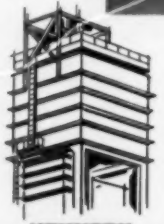

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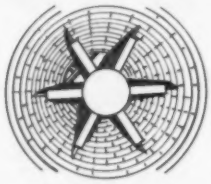

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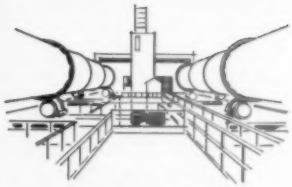

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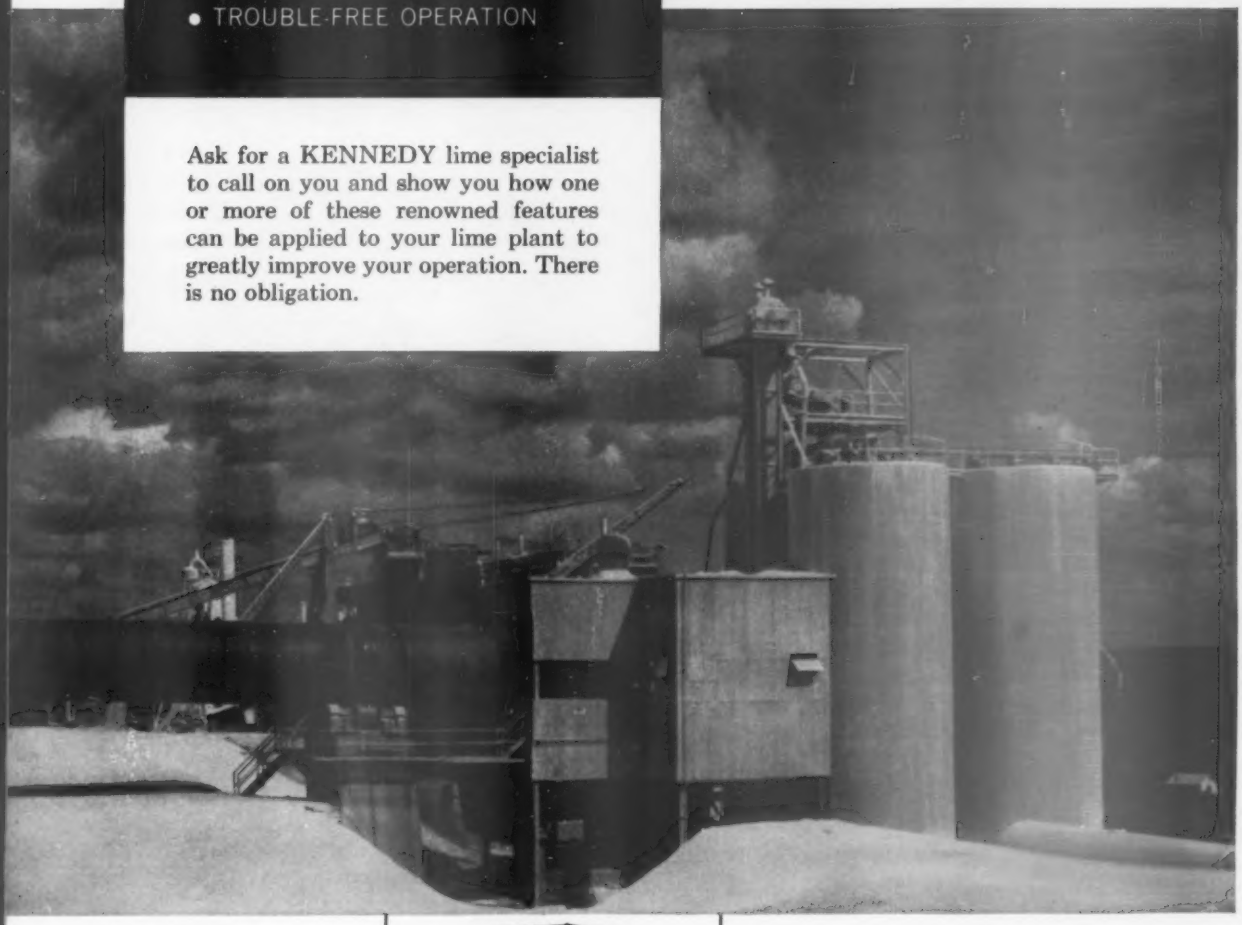

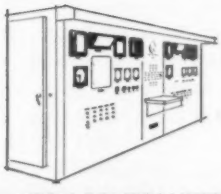

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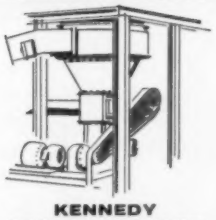

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"To protect yourself against making unnecessary contracts, you should understand the definition of a contract."

Contracts *continued from page 100*

An "executed" contract is one that has been fully and completely performed by all the parties to the contract.

An "executory" contract is one that has not been performed by either party. Under its terms, performance is to take place at some future time.

A "bilateral" contract is one in which the parties exchanged mutual promises—the promises were reciprocal. There is an exchange of a promise for an act. The offeror promises an act or forebearance in return for an act on the part of the offeree.

A "void" contract is one that has no legal effect —one the court will not enforce.

A "voidable" contract is one that has full legal effect as to one of the parties, but it is not enforceable against the other party against his will.

An "unenforceable" contract is one that meets the four requirements or essentials of a valid contract but, for some reason, may not be enforced by the court.

Thus, a contract arises out of a voluntary agreement between you and the other party. The obligations imposed by the contract are "self-imposed" —meaning that the parties "freely" entered into the contract.

If you don't already know, you might find it interesting to learn that a legal, enforceable business contract consists of the following elements:

Mutual assent involves an offer, a communication of the offer, an acceptance of the terms of the offer and a communication of the acceptance. Sometimes the courts say that mutual assent means a "meeting of minds." And this "meeting of minds" must be arrived at voluntarily. The bargain or agreement between you and the other party must not have resulted from fraud, duress, undue influence or mistake.

You and the other person must have had a legal capacity to contract. If you and the other party have no such capacity, a contract will not result even though mutual assent exists.

There must be legal consideration in every agreement, if a contract is to result. Every contract is an agreement, but not every agreement is a contract. The reason for this is that many agreements do not create legal obligations. For example, an agreement to attend a convention with someone is an agreement, but it is not a contract. The agreement does not create a legal obligation. It creates only a social obligation. The reason why the agreement does not contain legal obligation—and hence, a contract—is that it does not contain what is known as consideration.

While some people in business think that consideration means the giving or payment of money, this is not true. The payment of money will constitute "valuable" consideration, but this is not the only method of giving consideration. "Legal" consideration is found in the mutual promises of the parties if they surrender a legal right by making the promise.

For everyday illustration, suppose that A and B have an automobile accident caused by A's negligence. B threatens to sue A. So A says that if B will not file suit, he will pay B for the damages done to B's car. B agrees and does not file suit. Later, for some reason, A refuses to pay B. In this case, a consideration is found in the mutual promises of A and B. B purchased A's promise to pay by agreeing not to sue A. B gave up his legal right to sue A in a court of law.

Even though the minds of the parties have met, the parties have legal capacity to contract and consideration exists, still a contract will not arise unless the final element—legality of subject matter —is present.

If all four of these elements exist, a contract exists.

Not all contracts can be enforced. The law provides that certain types of contracts must be in writing to be enforceable. For instance, the following types of contracts must be in "writing" to be enforceable:

1. Contracts of executors and administrators who become personally responsible for the debts of the estates that they are administering.

2. Contracts in consideration of marriage, such as pre-nuptial agreements.

3. Contracts to answer for the debt, default or miscarriage of another. For example, suppose A tells B to sell some gravel to C and agrees that, if C does not pay, he (A) will pay the bill. This promise of A's must be in writing to be enforced.

4. Contracts involving the sale of real estate.

5. Agreements that may not, under their terms, be performed personally within one year. For example, suppose that on January 1, 1959, A orally agrees to employ B as a quarry foreman, work to start on January 5, 1960. Neither party could en-

Please turn to page 124

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by Kneeland A. Godfrey, Jr.

By turning its depleted pits into scenic park, home and school sites, Grand Rapids Gravel gets good gravel lands that other firms could not buy

Gravel pits are getting new faces

THE TIME IS FAST approaching when we'll have to go a long way for our deposits," says Don Battjes, vice president of Grand Rapids Gravel Co. The Grand Rapids, Mich., firm is doing its level best to postpone that day. By turning its depleted pits into scenic park, home and school sites, it gets good gravel lands that other firms could not buy.

Proof positive that land reclamation pays off by easing the purchase of new gravel lands is shown in two contrasting incidents. When one of Grand Rapids Gravel's competitors decided to build a new plant, residents of the area were furious. They took the issue to court, noting that the firm had been refused permission to erect the plant by the town board and was planning to put it up on land zoned for agricultural use. Furthermore, the aroused citizenry complained, the proposed plant would be a nuisance, creating "noise, dust and vibration."

Compare this with Grand Rapids Gravel's recent experience. In suburban Plainfield, both the zoning board of appeals and the town board agreed to rezone agricultural land to commercial use so the firm could put up a new plant there. The reason, Mr. Battjes is convinced, was his firm's land reclamation efforts and the fine publicity given them by the area press. Too, when the pit is worked out, Grand Rapids Gravel will deed a 300-ft. strip along the man-made lake to the town for use as a park.

"Some land-owners won't sell to any aggregate firm but ours," Mr. Battjes says proudly.

Reclamation aids a firm in other ways, too. The major reason why the reclaiming projects were started at Grand Rapids Gravel was to make it easier to get new deposits, but the company has also found that free advertising resulting from land reclamation can pay off in increased gravel sales. Several very favorable articles in newspapers and magazines resulted when the firm became the first in its area to practice reclamation. Today, "when a local citizen thinks of gravel, he thinks of Grand Rapids Gravel," says Don Battjes.

Land reclamation also increases resale value of depleted gravel pits. The choice lots beside Grand Rapids Gravel's man-made lakes command premium prices.

Finally, land reclamation brings a tremendous amount of good will to a firm and its men.

Things weren't always this smooth for Grand Rapids Gravel. The firm once had a problem like many another aggregates producer. "People were afraid they'd be stuck with a huge hole in the ground in the neighborhood if they sold land to us," Mr. Battjes says now. Knowing that a big hole would open up and a dusty, noisy, unsightly plant would make its presence felt, land-owners were hesitant to sell. *Please turn to page 108*

No time is wasted in reclaiming land at Grand Rapids Gravel. Here, as soon as a part of the Plant 6 pit was worked out, land reclamation began and a handsome home took shape at lake's edge

Here's the plan for reclaiming another worked-out pit. Peninsulas were purposely left as the pit was worked, to make a more interesting residential area. Open areas at lake's edge will be deeded to Plainfield township

Lamar Park in Grand Rapids' suburban Wyoming township is proud of its new swimming and ice-skating facilities plus play areas and baseball diamond. Formerly Plant 2, the area was sold at very low cost to the township

Gravel pits are getting new faces *continued . . .*

Another potent fact to consider: The Michigan state legislature considered a bill which would have required that all holes from gravel operations be filled after use. The huge cost of complying with such a law would be far greater than any reclamation expense.

The present happy situation came about almost by accident. Grand Rapids Gravel took a look at its depleted pits and figured "at least we could level them off to eliminate the piles of waste sitting around."

Soon calls began coming in from local citizens asking if the land were for sale. A school board member phoned, wondering if the board might buy the land for a needed school.

With five worked-out pits south and west of Grand Rapids, the firm had plenty of opportunities for pile-leveling. Soon the project grew. First step was to level off the old waste rock and earth piles, using the material for fill. Then grading equipment rumbled in to make smooth, easy contours from pit-edge to water level. Because the vacated pits fill with clear spring water, handsome lakes soon develop.

Topsoil, unwanted in sand and gravel operations, is often piled off to one side while the plant is working. After the depleted deposit is abandoned and the plant moved, the topsoil takes on new value. When seeded, it helps beautify residential and commercial properties.

Grand Rapids Gravel improves the appearance of the pits as soon as possible. When one section of a pit being worked is depleted, it is quickly graded and seeded.

Careful planning is now utilized in the company's reclamation projects. Side by side at Grand Rapids Gravel's Plant No. 6, southwest of the city, are two abandoned gravel pits. An imaginative architect suggested that the two lakes in the pits be connected by five channels, making four islands out of the isthmus between the lakes. Soon a total of 25 homes will rise on the islands, which will be reached from the "mainland" by bridges. The two lakes and the connecting channels will form an exciting residential area, with waterways for youthful fishermen and row-boating explorers.

It's only two or three years since the program really got started and received much notice. But already sales figures reflect the favorable publicity.

Don Battjes wrote a booklet to help tell the community the value of the sand and gravel industry and of land reclamation. Titled "Plan of Land Development," the brochure points out that land reclamation protects neighboring land from ugly, empty pits and preserves the tax base by providing high-assessment lakeside areas. At the same time, it preserves "part of the birthright of a community—its basis for making a living." Firms that reclaim lands are more likely to stay in business, providing continued employment for local citizens.

About 400 of the booklets have been distributed —some to aggregate producers as far away as Denver. Mr. Battjes also speaks before community planning commissions, explaining what he is doing with land reclamation and how it will benefit the community. When his listeners leave the meeting, they take along copies of the booklet—reminders that one local firm has found a new way to benefit both the community and itself.

The resale value of worked-out land is naturally increased by reclamation policies. Most aggregate lands are bought years before they become depleted. When made saleable by reclamation, the pits are worth a great deal because over the years the city has expanded out to the area, and because land prices in general rise with time.

The gain in good will is intangible, but Don Battjes feels it is nevertheless very real. He recognizes that some aggregates plants are dirty and unbeautiful. Noise, dust, big scars in the earth mean you're bound to create some ill will, he admits. So it is important to counter this with public relations and civic efforts. Example: The Battjes brothers saw to it that a school district was the purchaser of one piece of reclaimed land—and at a modest price.

In another good-will gesture Lamar Park, a broad expanse formerly worked by Grand Rapids Gravel's Plant No. 2, was sold at a very low price to suburban Wyoming Township to be used for public purposes. Today a baseball diamond occupies part of the park. Children mob the lake the year-around—it's a swimming pool in summer, a skating rink in cold months.

Land reclamation is just one progressive step for this forward-looking firm. Grand Rapids Gravel's sand and gravel operations and its several big ready mixed concrete plants have done well. Soon after Dewey Battjes founded Battjes Fuel and Supply Co. just after World War I, he found himself filling occasional orders for sand and gravel. Last year about one million tons of sand and gravel were shipped, plus about 185,000 cu. yd. of concrete. Now run by sons Clyde and Don, the firm has five sand and gravel washing plants and four concrete plants in the Grand Rapids area.

Does land reclamation pay? Ask Don Battjes and no question remains—it pays many times over.

Industry's top technical team at your service

ALLIS-CHALMERS builds a complete line of processing machinery for the nonmetallic minerals industry. Allis-Chalmers also produces electrical generation, distribution and utilization equipment. Out of this unequalled diversity has come the unique ability to integrate equipment for a complete process — yes, even for an entire plant.

Each Allis-Chalmers product department has its own specialists. Ideas and technical information received from many departments are correlated in *one* department specializing in *nonmetallic minerals industry application*. Components are matched to your requirements. New equipment is integrated with existing equipment into a productive, profitable operation.

Get all the facts. See your Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wisconsin. In Canada, write Canadian Allis-Chalmers Ltd., Box 37, Montreal, Quebec.

Laboratory testing takes guesswork out of planning

In the Allis-Chalmers processing laboratories, samples can be put through crushing, grinding, screening and other tests to predetermine the right equipment and process for any given circumstance.

"Work Index" method prevents misapplication

The "work index" formula used by Allis-Chalmers offers the only scientific method of determining equipment size and horsepower requirements.

Continuous field service keeps operation running smoothly

Your A-C representative makes a periodic checkup of equipment performance . . . passes on maintenance tips . . . arranges for additional testing. Orders for replacement parts are given emergency treatment.

At Allis-Chalmers, integrated thinking precedes the application of your integrated equipment

A-C ALLIS-CHALMERS

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Elevated scalping screen makes first size determination and scalps off unwanted debris. Sand goes to launder

Two sizes of silica sand are made by Murray Sand: a 20 x 48-mesh material and a 48 x 100-mesh fraction

Develop silica streak into Western Kentucky bonanza

IT TOOK FIVE YEARS for two energetic brothers, Taz and Dorris Ezell of Murray, Ky., to bring a fabulous reef of silica sand into full production. But success now seems assured for their Murray Sand Co. A new 30-tph. processing plant went into operation in November, 1958, with plenty of orders from glass makers and chemical plants to keep it humming for a long time.

The company has ample backing from local businessmen, and leases have been negotiated on more than 1,800 acres along the Blood River. This western Kentucky bonanza was discovered by Taz Ezell. As a highway engineer, he had observed streaks and seams of cream-white sand in the red clay of highway cuts. It took more than four years to find the financial backing to buy land, make exploratory cuts and find customers for the material.

There is more than 25-million tons of silica in the formation, a huge sand bar half a mile wide, 1½ miles long and ranging in depth from 80 to 190 ft. Development was based on a complete core drilling survey, and an open-pit mining program was blocked out for several years in advance. Up to 25 ft. of overburden is stripped and discarded. Digging and hauling about 12 miles to the processing plant in Murray is done by contractors.

The processing plant removes all clay, gravel, iron and other impurities. The most critical contaminant is iron, which occurs as a black oxide. The final product assays between .02 and .03 of 1 percent iron, with an occasional sample testing less than .01 of 1 percent of the unwanted iron. Each covered-top gondola is carefully checked and analyzed before it is shipped. Dorris Ezell is plant chemist and makes sure that each part of the processing plant does its job to keep the material within specifications.

Two sizes of silica sand are made by the new plant. A 20 x 48-mesh material is used as blasting

Please turn to page 112

New ROM vibrating screen

Shakes off brutal battering

...is handling 1000 tph of 48-inch limestone

High tonnages — hour after hour, day in, day out — such are the demanding conditions under which this screen is setting new performance standards.

Built for heavy-duty service, its husky support frame ignores persistent pounding. Its giant bearings are designed for long life. And as big as it is, vibration isolation on this *extra heavy duty* screen is handled effectively by air springs or steel coil springs.

For complete information, see your Allis-Chalmers representative or write for Bulletin 07B8368, Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada, write Canadian Allis-Chalmers Ltd., Box 37, Montreal, Quebec.

There's an Allis-Chalmers screen for every rock products application

A complete line of inclined screens for scalping, specification sizing, washing, rinsing, plus the headroom-saving *Low-Head* horizontal screen for heavy media recovery.

Planning a heavy media process? It will pay you to specify Allis-Chalmers screens.

Low-Head is an Allis-Chalmers trademark.

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Orders from glass makers, chemical plants to keep plant humming

Silica sand

continued from page 110

sand, for foundry core sand and by plate glass manufacturers. Automotive and specialty glass makers use the 48 x 100-mesh fraction. This size is finding an increasing market in nearby chemical plants and plastic processors.

Size distribution in the angular raw material makes it easy to process to meet glass plant requirements. There is remarkably little variation in the screen analysis in different parts of the tremendous deposit. Most of it checks out to about 20 percent plus 48 mesh and about 80 percent minus 48 mesh. Less than 10 percent of this fraction is in the unwanted minus 100-mesh range, and this small fraction of fines is readily removed in classifier overflows.

The Ezell brothers assembled and installed much of the materials handling and sand processing equipment in their compact new plant. The site at Murray was chosen because of the availability of natural gas, city water and rail transportation. The cost of extending these utilities to the Blood River district would have been prohibitive.

Raw sand is brought to Murray in trucks which dump into a 25-ton steel hopper. This bin is good for only about an hour's operation, but a small stockpile holds another hour's reserve. A small front-end loader draws sand from this reserve if the haulage trucks are delayed. When the hopper is full, trucks replenish the storage pile.

A small reciprocating plate feeder puts sand on a 20-in. inclined belt conveyor for the 80-ft. trip to the top of a 4 x 14-ft. single-deck vibrating screen. This unit, about 20 ft. above grade, scalps off all plus 20-mesh sand and any clay, gravel or roots in the raw feed. These are dropped to a pile on the ground to be hauled away.

Water sprays above the screen sluice through-screen sand to a 4-ft.-diam. launder. The thoroughly agitated and scrubbed sands from this unit are discharged to a 36-in.-diam. screw classifier. Waste water from the classifier takes away as much as 6 percent of the feed material, including all of the minus 100-mesh fines and clay slimes and practically all of the black iron oxide particles. "Clean" sand from the classifier goes to six attrition cells arranged in parallel batteries of three cells each.

Rubber-lined steel paddles in the attrition cells rotate at high speed through the sand slurry. The abrasive action of the silica grains upon each other as they are churned in these cells scrubs off the last traces of clay and iron which might adhere to the particles of sand. The sand slurry from the attrition machines is discharged to a 6 x 12-ft. rotary vibrating screen where the size separation at 48 mesh is made.

Please turn to page 114

Attrition cells discharge to rotary vibrating screen above two classifiers

Grinding mills grow... operating costs shrink

2000-hp mill does work of multiple units — at far less cost

It's the big mill that grinds out profits. Want proof? In a typical installation, a giant 13 by 20-ft, 2000-hp Allis-Chalmers mill replaced two 10½ by 17 units. Operating costs were cut by a whopping 25% without losing one ounce of capacity.

Grinding mills are on the grow. The single mill conserves floor space and affords better quality control with its improved circuits. Watch for the 2500 and 3000-hp Allis-Chalmers mills soon to be announced.

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A-5936-CM

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Dryer, elevator and shipping area

Silica sand *continued from page 112*

Efficient separation at this size is a major design problem which has not yet been fully resolved. A hydraulic separator installed with the original equipment was not able to make an acceptable split at 48 mesh. The makers of conventional vibrating screens could not promise more efficient operation with an economical number of screens. The rotary screen has produced an acceptable efficiency, but another unit will be needed to remove the minus 48-mesh undersize which now adheres to the larger material. Another screen will be justified, since the increased yield of the smaller sizes will quickly return the cost of installation.

The rotary vibrating screen turns at about 50 to 80 rpm., with 60 rpm. the most effective speed for this material. "Vibration" is introduced by up and down pulsations in the screen cage. As the wet material is introduced at the top of the screen, it spreads itself around the circumference of the screen cloth by centrifugal action. The pressure of incoming material and the action of the pulsations move the bed of material down across the face of the screen. Through-screen material is collected from the outer housing of the screen, while oversize drops into a hopper under the screen.

Each of the two screen products is discharged to a screw classifier. Plus 48 mesh is washed in a 20-in. single-screw unit, while the minus 48 mesh is processed in a 36-in. screw classifier. Each classifier discharges its finished product to a portable stacker that builds up piles of snow-white silica.

Careful management of the water is essential in the new plant. The two final classifiers and the six attrition cells use clean, fresh water purchased from the municipality of Murray, and the overflow from these units is pumped to a 15 x 100-ft. settling pond.

Water from the clean end of this pond is pumped to the top of the primary scalping screen where the first size separation is made. The overflow water from the first screw classifier, which holds most of the impurities in suspension, flows to a second tailings pond. Water in this pond is permitted to overflow to a drainage ditch and is wasted. Tailings that build up in this pond will eventually be removed and used as fill in the marshy land near the plant.

The portable stackers keep each day's production carefully segregated. All material is kept in storage at least 48 hr. for pile drainage and for bleaching in the air before further processing.

Silica is reclaimed for drying by a front-end loader. An inclined belt conveyor takes sand from a small hopper with a reciprocating feeder and discharges it into the 6 x 30-ft. gas-fired shell dryer. Depending upon the initial moisture, the dryer can handle between 20 and 30 tph. Final temperature of the silica is about 350 deg. F. to assure that it is bone dry before it is shipped.

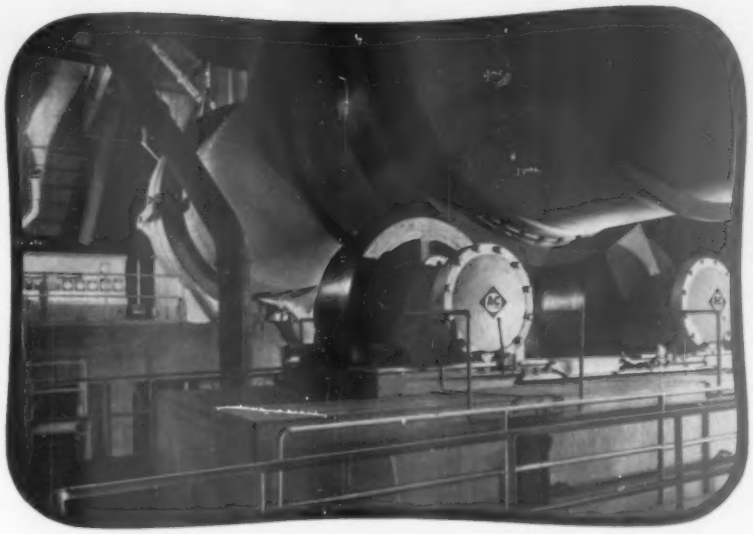
A centrifugal discharge bucket elevator takes the hot, dry sand from the discharge end of the dryer and lifts it high enough to be loaded into a covered-top gondola. The discharge chute of the elevator was made with an elbow which tumbles the material over itself as it falls. Each bend of the elbow is fitted with a permanent magnet. This catches and holds any grains of iron which may have slipped through the processing system, as well as any tramp metal which may be picked up.

With the future of their enterprise practically assured, the Ezell brothers have plans for adding to the efficiency of their plant. They are now surveying the market to purchase a new, high-capacity front-end loader. This will be able to handle a much larger pile of raw sand as surge storage and will be able to manage the piles of washed silica much more efficiently.

Steel storage bins will be built to store the wet, washed material above ground. This will improve the segregation of the sized silica, provide greater storage capacity and longer retention time for draining and bleaching, and will eliminate possible accidental contamination of the products. END

MAJOR EQUIPMENT IN THE PLANT OF MURRAY SAND CO.

Vibrating screen, 4 x 14-ft.	Smith Engineering Works
Reciprocating feeders (2)	Smith Engineering Works
Screw classifier, 20-in.	Smith Engineering Works
Launder	Western Machinery Co.
Attrition machine	Western Machinery Co.
Screw classifier, 36-in. (2)	Western Machinery Co.
Rotary screen, 6 x 12-ft.	Nordberg Mfg. Co.
Front-end loader	Ford Tractor Co.
Pumps	The Deming Co.
Motors	Brook Motor Corp.
Belt conveyors and structural steel work	Murray Sand Co.



Plan to stay ahead... MODERNIZE!

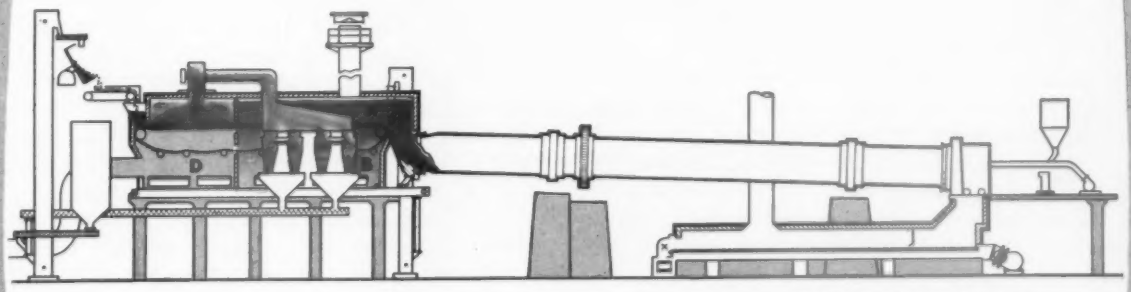
ACL pellet process cleans up cement making

Pelletizing of raw materials makes possible the dust-free operation of the *ACL* "double-pass" traveling grate system.

Along with clean production, making cement with pellets affords a barrel of bonus benefits — product reclamation, maximum burning efficiency, power savings, small space requirements.

How *ACL* "Double-Pass" System Works — In first pass (A to B) 1800° gas from kiln partially calcines feed in section nearest kiln. Gas temperature is reduced to 500°. Cyclones reclaim air-borne dust. In second pass (C to D) green pellets are dried and heated to about 500°. Gas stripped of heat and dust is exhausted in a mere wisp.

For the complete story, see your A-C man or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada, write Canadian Allis-Chalmers, Ltd., Box 37, Montreal, Quebec.



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VIC's new president:
W. V. Culver, Vermiculite-Northwest, Inc.

VIC reveals new masonry fill

A NEW KIND OF VERMICULITE MASONRY FILL for insulating block and cavity walls was announced at the 18th annual meeting of the Vermiculite Institute of Chicago. The new material was demonstrated at this meeting, held April 4 through 9, at Boca Raton, Fla. A patented spraying process coats the granules with a waterproofing compound to make them water repellent. Like untreated vermiculite, the treated material flows freely from the bag and can be quickly and easily poured into the cores of blocks.

Clayford T. Grimm, guest speaker and assistant director of engineering and technology for SCPI, told the convention about this test, developed by the National Bureau of Standards. The new fill was tested and approved at the Structural Clay Products Research Foundation laboratory, Washington, D.C.

An interest in treated vermiculite for cavity walls was also expressed by chief of the engineering division of the Army Corps of Engineers, Washington, D.C., Harry B. Zackrison. He said that the Corps of Engineers' present policy is to use cavity wall construction "right across the board, except where moisture control or heat control is not of major importance."

However, J. A. Kelley, president of Zonolite Co., Chicago, told the delegates that the new product is the economy solution to insulating walls where moisture or condensation may be a problem. He said that a block or cavity wall can be insulated for about 10¢ per square foot, compared with 25¢ or 32¢ for other insulation methods. He explained that this saves about $300 in the overall cost of an average home with 1,500 square feet of exterior wall area, and $6,000 on a school with 30,000 square feet of wall.

Tests also show that the new fill reduces heat loss by as much as 60 percent and makes possible the use of smaller and less costly air conditioning equipment, Mr. Kelley said.

C. A. Pratt, vice-president of Western Mineral Products Co., Minneapolis, Minn., discussed the market for vermiculite acoustical plastic in prestressed concrete construction. "The matter of fire ratings is probably the most pressing problem facing the prestressed concrete industry today," he said. "Two-hour and better fire ratings were formerly granted concrete construction if the reinforcing steel had a concrete cover of ¾ in."

Recently the fire ratings for concrete construction are being studied and revised, he continued. Because it is new, prestressed concrete must prove that it is fire resistant. The Underwriters' Laboratories gave a two-hour test to one prestressed unit with a minimum cover of two inches for all reinforcing steel. The unit passed the test; however, there was an emission of heat through the center of the slab. With the provision that three inches of structural concrete or its equivalent in resistance to heat transmission would be applied over the top, the prestressed unit was approved.

"To qualify for a two-hour rating, the prestressed manufacturer has the alternative of beefing up his section, making it more expensive and difficult to handle or adding fire protection such as vermiculite acoustic," Mr. Pratt said.

D. J. Boone, chairman of the agricultural committee, reported that sales of standard horticultural vermiculite and of vermiculite as fertilizer conditioner have substantially increased. The use of vermiculite as a carrier for weed and pest control is increasing also, due to favorable experience, he said.

Guest speaker Walter W. Underwood, executive director of the National Concrete Masonry Association, Chicago, welcomed vermiculite masonry

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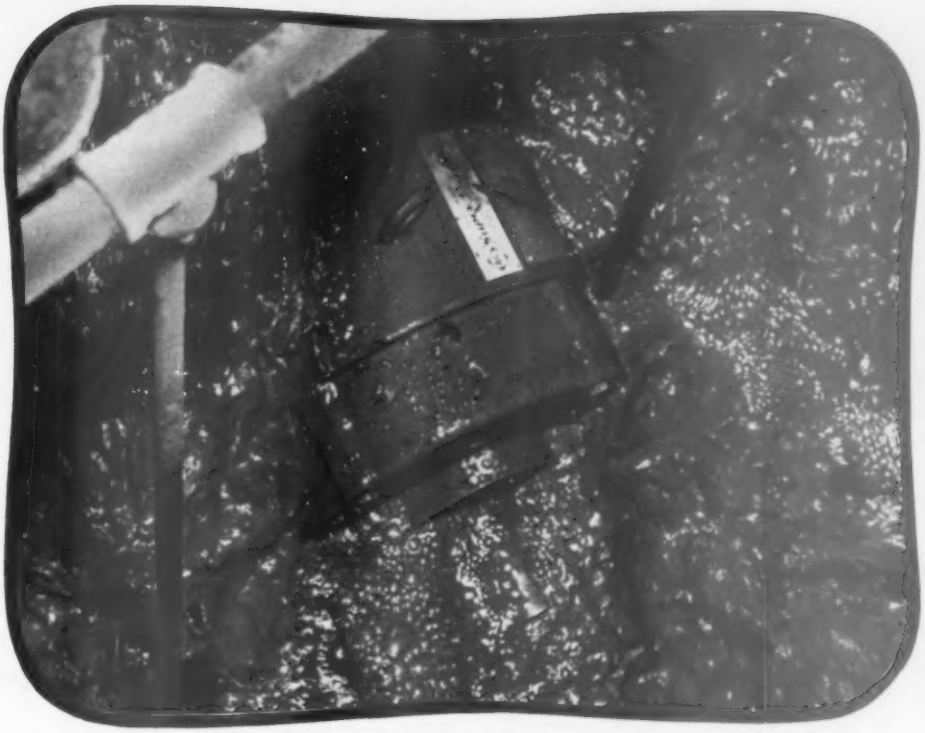

An open motor did what no other motor could... in a mud bath

This Super-Seal motor with *Poxeal* insulation and protected bearing was not fouled by mud. An Allis-Chalmers customer, in a frequently flooded area, required a motor that could readily start even after prolonged immersion in mud.

The "dirtiest mud available" was used in conducting the successful tests in the A-C Motor Laboratories.

Motor user requirements like this form the basis for A-C pioneer-leadership in motor development. Motor buyer needs created the most complete line of integral-horsepower motors in industry. Induction, dc, wound-rotor, synchronous, gear, tube-type and *Synduction* motors, and now *Super-Seal* motors! And, if these lines don't fill your need, A-C engineering excels in special design.

Motor users in the cement and other rock-product industries can benefit from this pioneer-leadership. Contact your A-C representative or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

Super-Seal, Poxeal, and Synduction are Allis-Chalmers trademarks.

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(Advertisement)

Shooting for a fine break, 25,000 cubic yards of overburden were moved with fine fragmentation in this blast at a Bingham Canyon, Utah mine site. Nineteen 50-pound bags of Spencer N-IV Ammonium Nitrate were used in each of twelve holes, 63 feet deep—a total of 11,400 pounds of Spencer N-IV.

Record Rock-Moving Operation Uses New Spencer N-IV

No more trouble with leaking oil. Spencer N-IV is available in 50-lb. polyethylene plastic bags, so tough they reduce breakage as much as 50%. (Also available in 50, 80, and 100-lb. multiwall paper bags.)

Completely free-flowing, Spencer N-IV is used here at the rate of 0.5 pounds per cubic yard of rock in quartzite and from 0.8 to 0.9 pounds in limestone areas.

Efficient, low-cost ammonium nitrate gives greater blast energy on giant project:

Believed to be the biggest single rock-moving contract ever undertaken in the Utah area, Western Contracting Corporation's operation is set up to move 2,000 yards of overburden per hour! The job involves moving 8 million yards of quartzite and limestone overburden on the upper levels of the Bingham Canyon mine. By using Spencer N-IV Ammonium Nitrate, the contractor is able to speed up blasting, while keeping costs low. Made by Spencer Chemical Company, the uncoated N-IV produces more energy than commercial grade ammonium nitrates—yet costs no more!

No secondary blasting has been needed because Spencer N-IV gives such excellent fragmentation. Although the oversized equipment used on the job could easily handle large boulders, the contractor prefers a fine break to keep wear and tear on the machines to a minimum. Spencer N-IV produces its superior blast effect two ways:

(1) Spencer N-IV has a special structure which allows the prills to absorb oil more easily, and (2) Spencer N-IV contains a much higher percentage of ammonium nitrate than other brands. Another advantage of Spencer N-IV is that it reduces priming costs because it can be initiated with a single strand of 175-grain detonating cord. No need to attach additional material at intervals, and you put an end to the danger of storing high explosives on the job site!

For more information on new Spencer N-IV Ammonium Nitrate, write to Spencer Chemical Company, Industrial Chemicals Division, 405 Dwight Building, Kansas City 5, Mo.

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For working the smaller tin mines in Malaya, dredging is out of the question

Vertical gravel pumps do the job

by Leo Walter

This 150-hp. slip-ring induction motor drives the vertical gravel pump

IT WOULD BE HARD TO FIND rougher working conditions for gravel pumping than those in the tin mines of Malaya. Nearly all tin mined in Malaya derives from alluvial sand deposits. For the smaller mines dredging is out of the question, and the hydraulic method—employing vertically suspended, direct-driven gravel pumps— is the only feasible means of working smaller deposits.

The popularity of the vertical pump design is due partly to the high output which can be achieved, partly to its low operating and maintenance cost. The upkeep item is important because unskilled labor is used—and maintenance men are scarce on the Malayan Peninsula.

Gravel-pump mining starts with a slurry. This is produced by means of high-pressure water jets which agitate and liquify the ore-bearing soil. From the working face, this slurry flows by gravity through channels into a sump. A gravel pump elevates the slurry to the top of a system of channels called a "palong."

The pump, located in a pump-house, lifts the slurry from 50 to 100 ft. into the palong, which is about 200 ft. long. The gradient of the pipeline is about 1:15 or 1:20. At a point 30 ft. from the top, 3 or 4 channels fitted with gates regulate the flow of the mixture of gravel and water. Here the heavy tin concentrates are trapped by a series of lateral baffles of varying depths.

During flow of the suspended sand and light clay particles, the latter fall out and the water is then discharged to waste. Once low-grade concentrates have accumulated in sufficient quantity, the gravel pump motor is stopped. The concentrates are then washed with clean water and sent to another plant for final cleaning.

The gravel pump handles 10—15 percent solids on the average. Sometimes the percentage of solids is less—for example, where stiff soil requires vigorous jet agitation. In some instances an excavator may be used for very stiff ground. Another

Please turn to page 122

Here's why a NEW 375-hp International®

CAN OUT-EARN ANY OTHER BIG

In the new 27 cu. yd. 495 Paywagon®, big earning advantages start with the new International DT-817 diesel engine. Forty-ton payloads highball upgrade or over rough and soft spots faster than ever behind the locomotive-like wallop of 375 turbocharged hp—more power per struck yard than any comparable wagon! Next, the "495" Paywagon's exclusive power-opened clamshell doors give positive dumping control—and retract parallel with hopper sides—"clean as a whistle" from wiper plate action! Pull-away clearance, to straddle 60″-high windrows, eliminates dumping delay! Too, the 495 Paywagon has new full 90° turning in either direction; new road-hugging design to gain top mph safely, out and back, at speeds up to 32.0 mph. Plus exclusive extra operator comfort and control features that reward you with extra production!

In the new 24 cu. yd. 495 Payscraper,® exclusive International DT-817 diesel power earning advantages team up with new cutting width and tapered bowl design—to heap-load faster than any other 3-axle scraper of its size. And it hauls at speeds up to 32.0 mph! The scraper's big 131″ cutting width promotes fast dirt break-away, permits both unit and pusher to operate within the cut for best traction. Exclusive tapered bowl design boils dirt toward center, reducing side spillage; permitting positive, forced ejection even of sticky or frozen materials. More hp per struck yard than any competitive unit—wheel and bowl leveling adjustment —custom-designed cable control unit—full 90° turns—all team up to make the 495 Payscraper the top producer of its size class!

In the new 24 cu. yd. 295 Payscraper—you get the same big-capacity, high-torque engine that powers the 495's: the 375 hp DT-817! You get haul speeds up to 29.1 mph—matched with new automotive comfort and control features, that include a 16-adjustment seat. And the scraper unit of the 2-axle 295 is the same heap-loading, tapered bowl, wide-cut scraper featured in the 495 Payscraper!

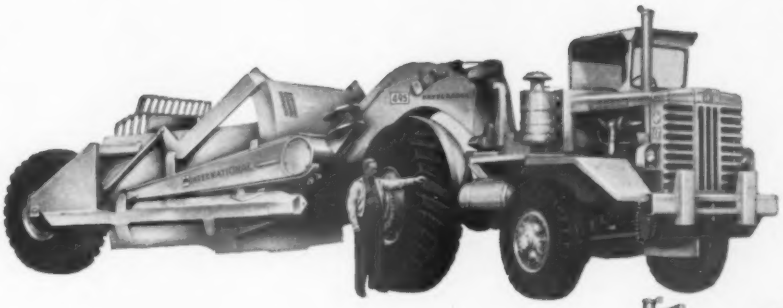
Match any new International Earthmover against any similar equipment on your job or in your mind—for capacity, operating ease, low costs and net profit earning ability. See your International Construction Equipment Distributor!

Heaped, the new 375 hp International Paywagon highballs 40.5 cu. yd. (or 40.5 tons) as fast as 32.0 mph. Choose either 4-speed Power Shift or 9-speed constant mesh transmission drive.

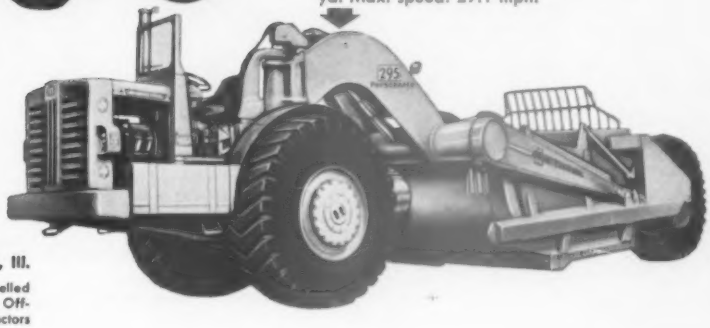
Earthmover

WHEEL RIG ON YOUR JOB!

Controlled with new custom-designed cable control unit, the 375 hp International 495 Payscraper speeds 34 cu. yd. heaped loads up to 32.0 mph. Its apron can "gape" open as high as 98"—for sure ejection of all materials!



Positive-acting air brakes—16-adjustment spring hydraulic seat—unobstructed vision—flush-deck safety—power steering—all add up to production-boosting operator comfort and ease of control of the new 375 hp 295 Payscraper. Heaped capacity: 34 cu. yd. Max. speed: 29.1 mph.



International® Construction Equipment

International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

Gravel pump, suspended by chain block, is half-submerged in sump

Gravel pumps *continued from page 119*

reason for high dilution may be greater distances between working spot and pump.

Vertical gravel pumps are claimed to have many advantages over horizontal types. The whole pumping set can be suspended by chain blocks and suspension rods. This means that the pump is half-submerged in the mine sump, with very small suction loss. Pump and motor shafts are solidly coupled.

The pumps described are normally of local manufacture. The motors, manufactured by English Electric Co., are rated at 150, 200 or 250 hp. **END**

Thatched structure at right houses gravel pump which lifts slurry to the top of a system of channels called a "palong" (background)

Can your loader "lift its lip" and duplicate dozer action? No?

Then trade it off without delay! Because you'll miss money-making opportunities right and left without this big-capacity 4-in-1 action. And you have positive "radius control" of dozing depth; plus strength for hard digging! Here, the new International Drott TD-20 4-in-1 is dozing heavy gumbo material like a full-size blade!

Can your loader grade and strip like a carry-type scraper? No?

Then consider what extra service—and extra-valuable service you would have—with versatile scraper-like action at your fingertips with a moderately-priced 4-in-1! This TD-20 4-in-1 is stripping sticky clay. It can also grade or spread materials with similar accuracy.

ONLY A CLAM-ACTION 4-IN-1

can replace up to $100,000 of limited-duty equipment!

Can your loader "bottom-dump" and handle sticky materials? No?

Then retire the "relic" and go modern! You can't choose the materials you excavate. You can't prevent adverse weather that makes materials sticky! But 4-in-1 bottom-dumping eliminates the sticky materials problem and gives you a vital dumping height plus advantage over ordinary roll-forward buckets.

Move the selector lever—prove to yourself only the clam-action 4-in-1 doubles for a whole spread of "big-ticket" rigs—gives instant changeovers. Compare 4-in-1 capacity and versatility to any single-action loader. Measure exclusive shock-swallowing Hydro-Spring advantages. See your International Drott Distributor for a demonstration—prove you can save up to $100,000 on equipment!

Does your loader have measured, advertised breakout action? No?

It's the genuine and exclusive pry-over-shoe breakout action that enables International Drott 4-in-1's to replace far costlier boom-type rigs on jobs like breaking up and loading out hard, heavy stratified or embedded materials. The NEW TD-15 4-in-1 exerts the enormous force of 39,200 lbs!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

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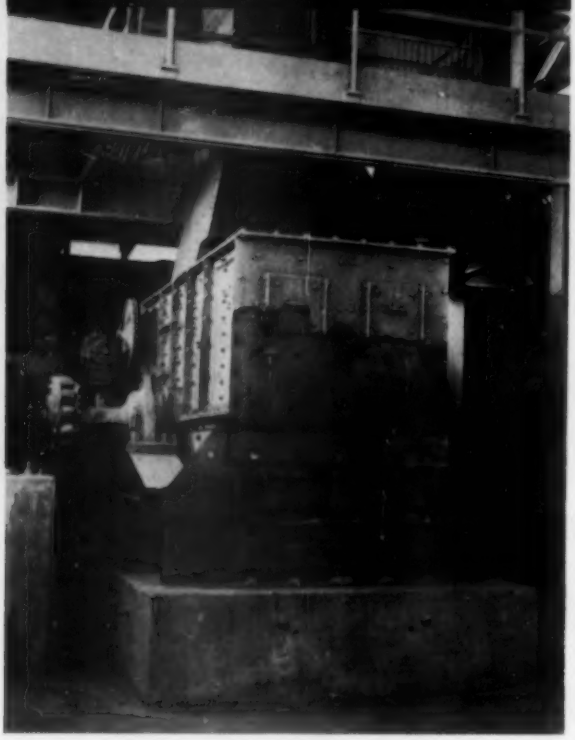
Another size reduction problem solved by Hammermills, Inc.



Bulldog Non-Clog Hammermill

Crushes 375 to 400 tons wet limestone per hour

Limestone fed to this primary Hammermill at a new Midwestern cement plant contains 12% silica. It is mixed with clay and is high in moisture. The Bulldog Non-Clog Hammermill crushes this material at a rate of 375 to 400 tons per hour with a power consumption of 600 h.p.

Bulldog Non-Clog Hammermills are known throughout the industry for their ability to handle tough jobs. They'll give more capacity per horsepower. They require less maintenance.

Hammermills, Inc. can help you lower costs and increase your capacity. For the names of the Hammermills representative in New York, Chicago, St. Louis, Toledo, Dallas, Denver, Los Angeles, and Melbourne, Fla., simply write us.

Manufacturers of Hammermills for primary and secondary crushing • Impactors • Jaw Crushers • Roll Crushers • Cone Crushers • Wobbler Feeders • Apron Feeders

HAMMERMILLS, INC.

Subsidiary of PETTIBONE Mulliken Corp.

625 C Avenue N. W., Cedar Rapids, Iowa

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Contracts

continued from page 104

force the agreement, because it could not be performed within one year from the date it was made.

6. Agreements to sell personal property above a certain amount, usually $50, unless there has been part payment or part delivery.

Now you can clearly see that, in order to make a business contract for your company, certain legal "tests" must be met. In short, there must be mutual agreement between you and the other party, voluntarily arrived at. The parties must have had a legal capacity to contract at the time they entered into the agreement. The agreement must be supported by a valid or legal consideration, and the subject-matter or purposes of the contract must also be legal.

Do you know that only the parties to a contract have any rights or duties under the contract? However, all rights under a contract may be assigned without the consent of the other party, unless the contract is made non-assignable by its terms.

But if disagreement arises and the controversy goes to court, the court will still have to decide whether or not a contract actually exists, and, if a contract does exist, what the rights and duties of the parties are under the contract.

Contracts may be discharged by performance, agreement of the parties, impossibility of perform-

Please turn to page 127

"At first he said I couldn't pay him enough to baby sit with Junior, but when I promised to take him down to the quarry and show him my new 1½ yard shovel; he said he'd be right over . . ."

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New Conveyor System

. . . gives far greater belt life

. . . reduces maintenance

. . . and you get it *exclusively* from McNally Pittsburg

A completely new Cradle Idler* is the key to this high-efficiency McNally Pittsburg conveyor design. By mounting new 5" rubber rollers on a *nonrotating*, stainless steel rope, dangerous harmonics and "loping" are eliminated—permitting greater capacity and faster belt travel with minimum spillage. The *true catenary* of this suspension provides uniform belt support with no bends or creases—belt life is substantially increased.

Because of the unusual simplicity of this new McNally Pittsburg conveyor design, installation costs are lower—and maintenance costs are at a minimum.

* Patents Pending

New shock absorbing 5" rubber rollers have precision ground ball bearings, prelubricated and lifetime sealed.

With true catenary suspension, belts stay flat; support is uniform under all conditions for far longer belt life.

On-the-job construction is simple. The entire conveyor uses standardized components for easy assembly to fit your particular needs.

WRITE TODAY for details on this new McNally Pittsburg conveyor which costs less to install . . . saves money every day it is in use.

McNALLY PITTSBURG

McNally Pittsburg Manufacturing Corporation—
Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio
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McNally Pittsburg Mfg. Corp.
Dept. RP
Pittsburg, Kansas

☐ Please send information on the new McNally Pittsburg belt conveyor.

☐ Have Sales Engineer call for further consultation.

Name_____ Title_____

Company_____

City_____ State_____

◀ TRAVELING ALONG KILN SHELL on steel cable, the *Radiamatic* unit provides continuous temperature measurement.

ElectroniK CIRCULAR CHART RECORDER records kiln shell temperatures and reference points showing position of *Radiamatic* along kiln.

RADIAMATIC RADIATION DETECTOR responds to 98 per cent of any temperature change within two seconds, is automatically compensated for ambient temperatures up to 250°F.

Guard Against Kiln Hot Spots

You can detect potential hot spots with a Honeywell *Radiamatic* radiation detector scanning the kiln shell the length of the hot zone. The *Radiamatic* unit works in conjunction with an *ElectroniK* circular chart recorder which records both temperatures and reference points showing the position of the detector along the kiln. When the temperature reaches a preset limit, a light flashes, warning the burnerman that a potential hot spot is developing.

Your nearby Honeywell field engineer can give you complete details of the system most applicable to your kiln. Call him today...he's as near as your phone.

MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.

Honeywell

First in Control

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Contracts *continued from page 124*

ance or by operation of law. Obviously, a breach of a business contract by one of the parties gives the other party a right of action for damages and, under certain circumstances, will discharge his obligation to perform any further duty under the contract.

You should keep a copy of every company business contract you sign. Without a genuine copy, you may have a hard time proving what the contract involves. Before you enter into any company business contract, you should be sure that it is entirely clear and understandable. It should contain all the details which are intended to govern the transaction.

Good rules to remember:

Don't make business contracts unless you are willing to assume the outcome, and don't sign any business contracts unless you know exactly what you are signing up for.

Know what a business contract is and what it entails.

Protect your company's interests by avoiding legal mistakes.

To be absolutely safe, consult with a competent attorney. By doing so, you will be able to handle your company business matters more efficiently and economically without racking your brains about the legal pitfalls surrounding contracts. **END**

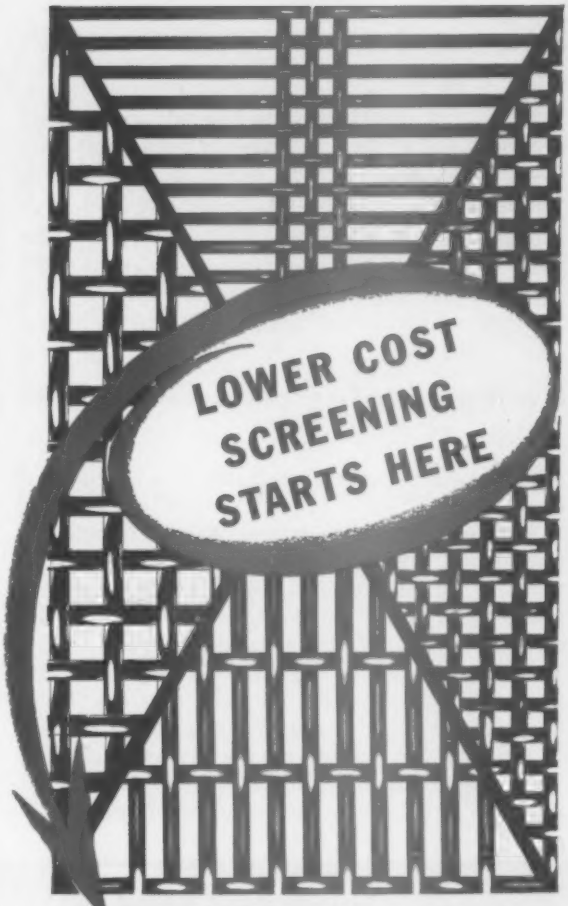
VIC meeting *continued from page 116*

fill as an aid in helping the industry obtain a larger share of the home market. He presented slides showing new decorative effects in concrete block walls.

One day of the meeting was devoted to selling and selling ideas. H. Dorn Stewart, president, Barrett Division, Allied Chemical Corp., New York, N.Y., discussed the "Dynamics of Distribution." Burton H. Holmes, technical editor of **Progressive Architecture,** New York, talked on "How to Sell the Architect." Don Knecht, president, National Building Material Distributors Association, Rapid City, S.D., gave "A Modern Look at Distribution."

At the convention, W. V. Culver, secretary-manager of Vermiculite-Northwest, Inc., at Seattle, Wash., was named president. He succeeds J. Brooks Robinson, Great Falls, Mont. Edward R. Murphy and Walter J. Bein were retained in office as managing director and treasurer.

Please turn to page 128



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Up to twice the life of competitive screens is the record of STARSTEEL replacements—even better in some cases!

One reason is STARSTEEL's extremely abrasion-resistant high-carbon wire. Another is more rigid, accurate weaving and machine finishing that guards against buckling and distortion. Still another is STARSTEEL's precision-applied hook strips which make installation easier, prevent breaking, insure much longer wear.

There are many more reasons why your best buy is STARSTEEL, but the best one is they cut your screen cost as much as half. *Write for catalog.*

Quick Shipment from stock on most weaves and sizes.

Star will produce screens or cloth from stainless or other steel alloys, Monel, brass, bronze, copper, aluminum or any metal that can be drawn into wire. Inquiries invited.

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Subsidiary of Ludlow-Saylor Wire Cloth Company, St. Louis, Mo.

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VIC meeting *continued from page 127*

Three new directors were elected: Jack Lyall, president and general manager of Southwest Vermiculite Co., Albuquerque, N.M.; R. W. Sterrett, vice president of Zonolite Co., Chicago, and L. J. Venard, president, Western Mineral Products Co., Minneapolis, Minn. END

Rocky's Notes *continued from page 16*

school, Azbe began his education as a mechanical engineer.

The part of Europe where Azbe originated is and always has been inhabited by a mixture of races or tribes; various languages were spoken, and being a part of the Austrian Empire, German, of course, was the official language. Fortunately, Azbe learned this during his short schooling. By use of his German, he managed to reach Hamburg in a couple of years, and from there shipped to America as a coal passer on a German freighter. Thus began his education in "combustion engineering." Fortunately for him (and ultimately for the rest of us), our immigration laws at that time were non-existent, or at least lax, so that he was able to enter our Land of Opportunity rather unceremoniously and uninvited.

After a brief pause in New York, where he was able to find friends among his countrymen—he knew no English language whatsoever—he managed to find his way to St. Louis, Mo. There he utilized his experience as a "combustion engineer" and his native wit, intelligence and industry to study engineering and the English language. Nine years after his unceremonious entry into this country we find Azbe in St. Louis already a junior member of the American Society of Mechanical Engineers, contributing a paper at its annual meeting, on the subject of "Power Plant Efficiency."

Young, ambitious and daring as our friend then was, he was well aware that many older and more experienced engineers—with college and technical school educations—had already written as much on this subject as he could ever hope to know; yet with the keen perception that he had been endowed, he could understand, though much attention had been given to the operating efficiency of large public service power plants, very little literature existed on the equally important subject of power plants designed to serve small industry, public institutions, etc. Since his experience in this

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field was not only genuine but thorough and his analyses of experience helpful and instructive, his paper was readily accepted.

Now, Azbe feels that his debut as a consulting combustion engineer sprang from encouragement derived by that paper and the reputation it gave him. Locally at first, but, as we know, eventually worldwide. Through his local reputation in St. Louis, some now long-departed friends in the lime industry there, perceived that combustion efficiency in lime manufacture was a minus quantity. When he came thus to look into the lime industry, Azbe soon perceived one in much need of expert advice. So he proceeded to make himself that expert. Naturally, being already convinced of the advantages of making himself known, he has been a steady and valued contributor to the literature of the lime industry ever since.

With such a background it is quite understandable why our friend, Azbe, wants to be helpful in starting other young men on the road to fame and, at least a fair degree of, fortune. Of course, the idea is hardly unique or even original, since many engineering and technical societies have had such funds, and award money, medals and certificates for prizes to authors. It is somewhat unusual in trade or industrial associations, but nevertheless just as appropriate. During our own professional life we have seen one or two associations in our field, at their annual conventions, go from papers contributed by outsiders to papers contributed almost exclusively by their own members in these industries. And, by this means, we have seen the programs of the annual conventions of these industries become far more interesting and helpful to their members. It has developed talents that many persons did not know they had. We believe these associations could well go a step further, and reward their outstanding "home-grown" contributors with the honor of receiving prizes for the best papers.

END

Rotary kiln

continued from page 85

would be 2,150 deg. F. and for clinker, air would have to reach 5,200 deg. F. to recover all the heat in the clinker. At lower thermal efficiencies, the air preheat would be less, but chances are that not all of the air would be available for cooling, resulting again in unattainable temperatures.

Since the normal air supply is incapable of abstracting the heat of an efficient kiln, an auxiliary carrier is demanded. Coolers of today resort to

Please turn to page 130

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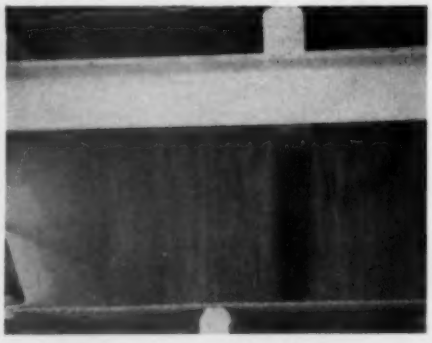

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Rotary kiln

continued from page 129

this, but the excess heat is carried to waste. In our case the gaseous carrier recovers the heat. Excess air could be used for this purpose, but it would shorten the flame and has other objections. Therefore recirculated gases are resorted to, with the principle being shown by sketch and also diagram of the consolidated Fig. 2.

Recirculation of kiln gases in lime kilns has been practiced for a long time and was repeatedly patented. This also is recirculation, but of an entirely different intent. It is to abstract the heat in the cooler where it is superfluous, and deliver it to the calcining and preheating zones where it is deficient. Unless recirculated, there is not sufficient preheating for the large amount of calcareous and argillaceous matter passing down the kiln.

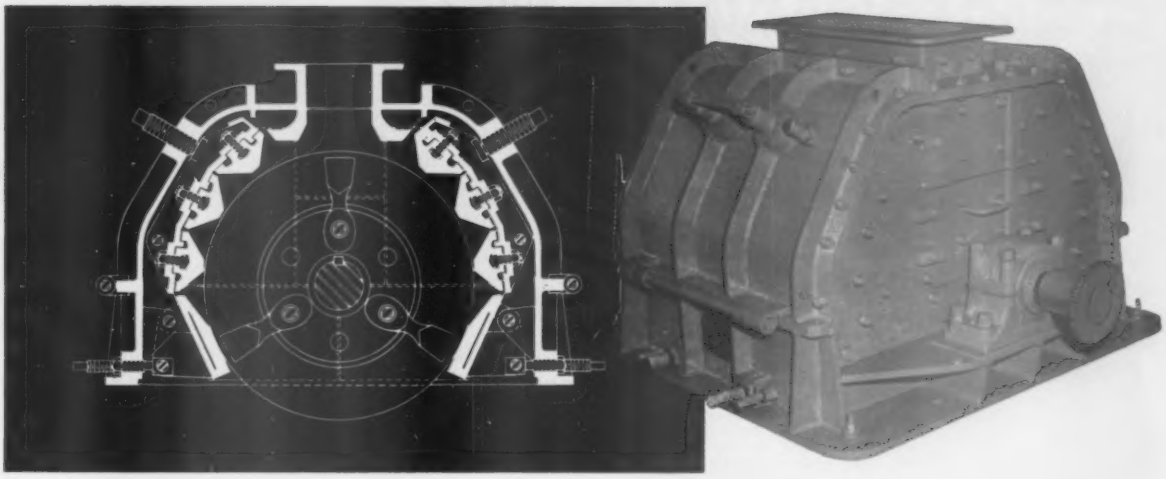
The normal rotary dry process cement kiln has a very high waste gas temperature. That this is so, is because the kiln is a poor heat absorber, which we correct by means of segments, and is also so because in the kilns, all of them inefficient, there is not enough kiln charge coming down the kiln to cool the gases passing up the kiln.

But if heat transfer is improved and the kiln made efficient, the gases would cool to a point where there would be insufficient heat for preheating. This would limit any further efficiency increase. The solution to this is a heat carrier, from the cooler to the rear kiln portions, which can only be accomplished with a special cooler.

The consolidated illustration indicates the cooler to be of a double-level type, the recirculating gases passing through the upper or hot section, quickly quenching the clinker to the 1,800 deg. F. level desired for the process. In the lower section of the cooler, atmospheric air would be the cooling medium; Fig. 4 shows one version of a cement clinker cooler of this type. Arrangements achieve more than just cooling; they control the rapidity of combustion, luminosity and temperature of the flame, as well as its lateral distribution and longitudinal penetration.

The two-stage clinker cooler, the kiln hood and the burner are an integral unit. Under the system shown, a range of gases of various composition and temperature may be pre-admixed with the fuel. The conditioned flame resulting from injection is enveloped by other gases in a manner conducive to either slow or rapid mixing, to short intense or an extended luminous flame, spreading, projecting or rolling. The aim is temperature control and blending to produce luminous reactions which may be elementarily represented by: $CH_4 = C + 2H_2$ followed by $C + \frac{1}{2}O_2 = CO$ and $CO + \frac{1}{2}O_2 = CO_2$; and to avoid as much as possible: $CH_4 + O_2 = CO_2 + H_2O$.

Please turn to page 132



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Pictured above is one of several types of Pennsylvania Reversible Impactors. The breaker block areas on both sides of the mill are adjustable, permitting the operator to move the blocks towards, or away from, the hammer circle. The upper blocks on each side of the rotor can be adjusted independently of the lower blocks, and vice versa. This complete adjustability gives you option of product size, within a reasonable range, and assures uniformity and constant tonnage of product during the entire life of the hammers and blocks—a money saving feature that is very desirable. For complete information on the entire line of Pennsylvania Reversible Impactors, send for bulletin 6018. Pennsylvania Crusher Division, Bath Iron Works Corporation, West Chester, Pennsylvania.

Pennsylvania CRUSHERS

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Pear shape (lbs.).....	1500	2000	3300	4000	5200	6500	8000	10,000
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Rotary kiln

continued from page 130

The kiln-hood junction is equipped with an aerodynamic seal under pressure from the recirculating fan. This is conductive to cooling of the nose ring, and allows pressurizing of the hood for forced draft operation and attainment of higher kiln capacity when induced draft is deficient.

Cement kilns have been improved: Their efficiency was as low as 20 percent; now some few are at 40 percent. There are fantastic struggles made to save heat at the exhaust, which helps but does not help enough. We may say the development has stagnated at about 40 percent, at around 650,000 Btu. per barrel of clinker, and no further improvement in sight.

Segmentation will help. It will improve the kilns, but not as much as one would like to think, because the problem of cooling the clinker will then become critical. There will be more and hotter clinker with less air to cool it. This would be a condition completely impossible for the conventional clinker coolers of today which operate by the wrong cross flow principle, wasting of heat by radiation and through bleeding of air. But even if these coolers would be perfect heat exchangers, as some lime coolers are today, they still would fail, unless recirculation be practiced as here featured—that is, an additional heat carrier interposed to balance thermal availabilities and requirements at the kiln ends. **END**

"WHAT A MAN; ALL DAY LONG HE GRINDS ROCKS AND ALL NIGHT LONG HE GRINDS HIS TEETH!"

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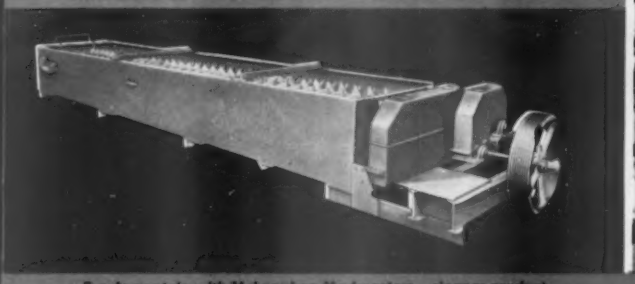
In Standard Materials Corporation's Maywood (Indianapolis) plant, two 10" x 30' McLanahan Log Washers.

In the Plainfield, Indiana plant, a 10" x 25' Log Washer.

In the Clinton, Indiana plant, a 10" x 25' Log Washer.



Fundamentals with McLanahan Mudmasters—cleaner product, profitable tonnages, up to 40% lower power requirements, compared with other types of washers.

Selected by STANDARD MATERIALS not once but 8 times

This progressive Indiana and Kentucky operator selected eight McLanahan Mudmaster Log Washers for installation in seven gravel plants during a two year period.

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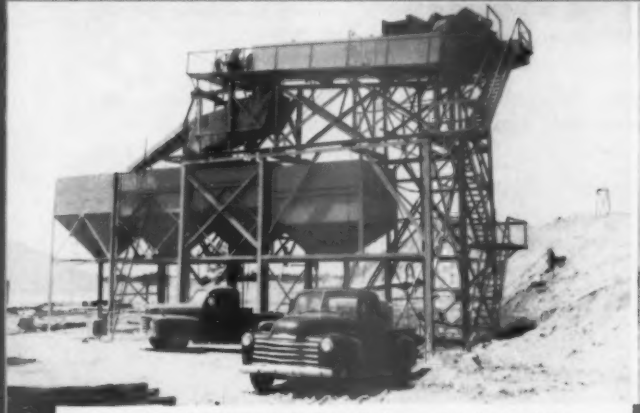
LOG WASHERS

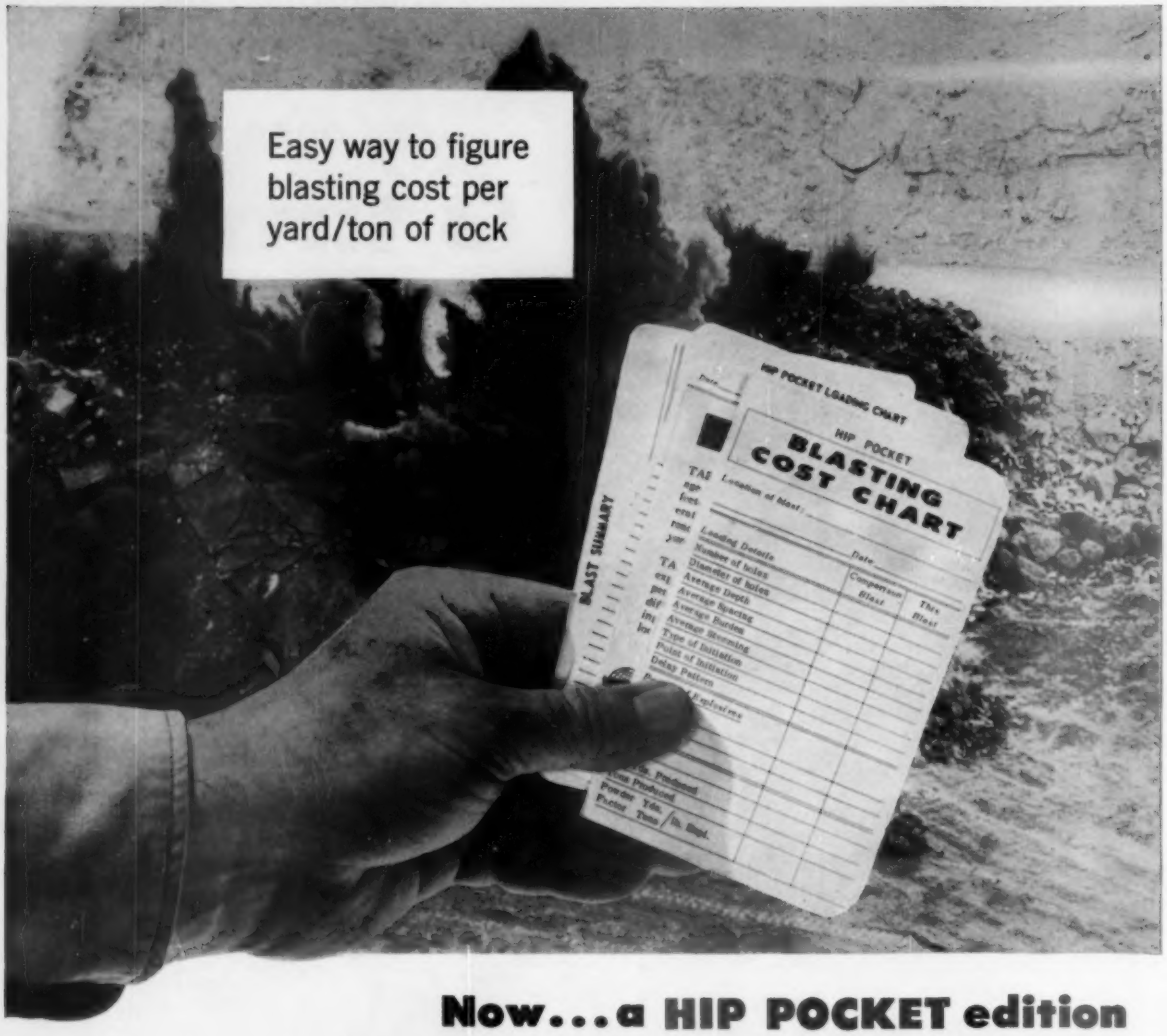
In the Milton, Kentucky plant, a 10"x30' McLanahan Log Washer.

In the Burlington, Kentucky plant, a 10"x25' McLanahan Log Washer.



In Standard Materials' 86th Street (Indianapolis) plant, a 10" x 25' McLanahan Log Washer.

New under construction, the Speedway (Indianapolis) plant's 10" x 30' McLanahan Log Washer.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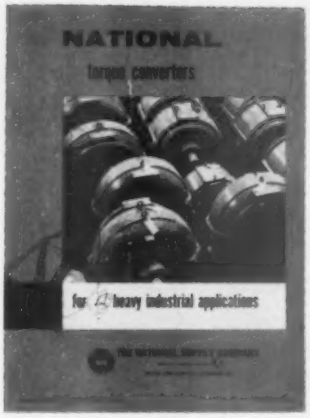
NEW LITERATURE



Torque converters

THE NATIONAL SUPPLY CO. has published bulletin No. 496, a 12-page story of the general advantages of torque converters and the special features of this equipment, proved on the company's oil well drilling rigs. Design and principle of operation are illustrated.

Enter 600 on Reader Card

Heavy-duty screens

PIONEER ENGINEERING, POOR & CO. has issued a 16-page booklet that describes its line of Mesabi screens. One major improvement, reports this booklet, has been the addition of secondary spring type of screen suspension which eliminates transfer of vibration to supporting structure, increases screen efficiency and reduces strain on screen assemblies. Complete illustrations of this new type screen suspension are included.

Enter 601 on Reader Card

Traxcavators

CATERPILLAR CO. has issued a 6-page pamphlet that describes and illustrates design improvements, increased power, performance and work capacity of the new No. 933, Series F model. One new feature is a bigger 1⅛-cu. yd. bucket that holds 12½ percent more than the Series E. New engines and balancers are also described.

Enter 602 on Reader Card

Power plants

THE ENGINE-MATERIAL HANDLING DIV., Allis-Chalmers Mfg. Co., has released Catalog BU-540 that describes the 2100 and 1600 diesel engines with illustrations, charts, graphs and a cutaway view of the engines. Also available is a 4-page brochure, MS-1328, which tells about the advantages of the 2100 engine as the power plant for its HD-21 turbocharged diesel crawler tractor.

Enter 603 on Reader Card

7G Bulldozers

CATERPILLAR TRACTOR CO. has released a 4-page booklet, that details information on tests in which the Caterpillar No. 7G bulldozer was pitted against No. 7S bulldozers on jobs in Missouri and Iowa. With the 7G bulldozer there was a 79 percent increase in production on quarry operation requiring stripping of rock-laden overburden. A 60 percent higher production on land clearing, stumping and piling was also found.

Enter 604 on Reader Card

All-formation drill bits

HAWTHORNE, INC. has issued Catalog 59 which describes the full line of "Blue Demon" replaceable blade drill bits. Covered are a complete range of sizes from 1⅞ in. through 13 in. Four types of interchangeable blades are offered. New this year is a 4-blade Carbide Insert Rock Bit developed for either air or water drilling in the harder formations. Of use to field crews are two pages of Drill Rod Thread information.

Enter 605 on Reader Card

Pulley and belt repairs

GENERAL SPLICE CORP. has released three brochures. The first, called the Minet Pulley Lagging Method, describes an easy method to apply neoprene pulleys without removing the pulley. The second, the Minet Universal Belt Repair Method, explains a method of immediate repair that uses three materials: putty, cover stock and ply fabric. The third brochure gives all the needed information about the Minet hinged belt splice.

Enter 606 on Reader Card

Engineering constants booklet

FALCON MFG. DIV., First Machinery Corp., has released a reference booklet that contains short-cut tables, formulas and the majority of technical data required for daily plant operation.

Enter 607 on Reader Card

Asphalt batch plant

WHITE MFG. CO. has released Circular 47-B on its half-ton Model L-20 asphalt batch plant. Capacity of the portable unit is 25 tph. Larger dryer and burner than earlier models mean increased drying capacity and hotter aggregates.

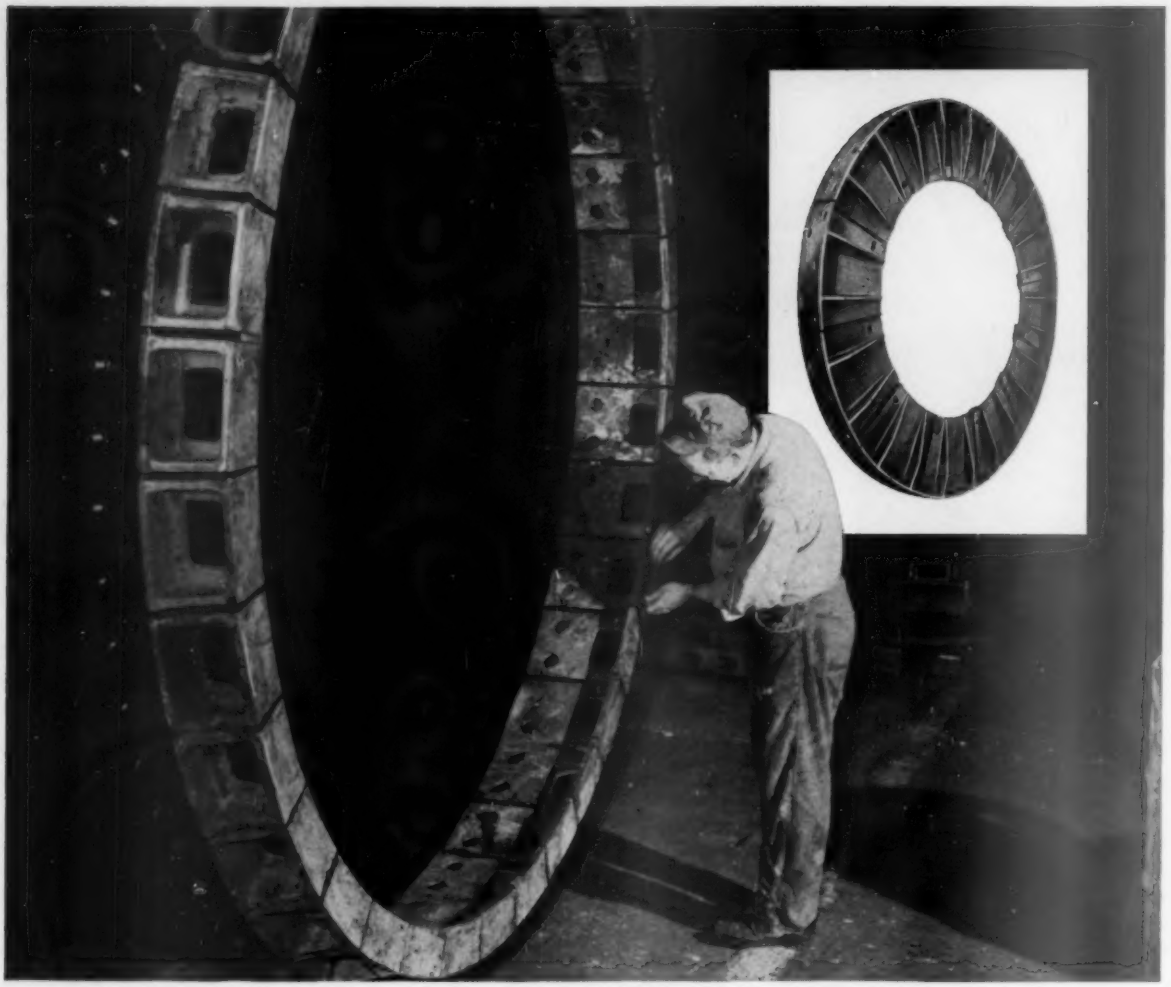
Enter 608 on Reader Card

Rock bits for air and water drilling

OIL TOOL MFG. CO. has issued a completely revised catalog illustrating their entire line of HoleMaker and K-Type rock bits. Recommendations for use in various formations, together with drilling weights and rotary speeds, are given.

Enter 609 on Reader Card

(Continued on page 138)



IN CEMENT, LIME, AND DOLOMITE PLANTS...

B&W Nose and Tail-Ring Castings Demonstrate Longer Continuous Service

Longer brick life and longer continuous service are being attained by 275 kilns in 54 plants using B&W Nose and Tail-Ring Castings. In many cases, the life of these castings has exceeded 9 years.

Light and strong B&W Alloy Castings have improved kiln performance in most installations. Made of heat-resisting Grade HH alloy, nose ring castings eliminate belling out of the kiln shell, assuring longer brick life and longer continuous operation of the kiln. By protecting the end of the kiln shell from direct flame, the nose ring castings prevent "feathering-down" of the shell because of oxidation. Their design eliminates cracking and warping, experienced with large size castings.

Small size and light weight make B&W Castings easy and inexpensive to install. The protecting flange on the nose ring castings permits the use of low-alloy steel bolts for fastening.

Spare part inventory may be kept low because the same nose ring castings may be used on kilns varying up to 4 feet in diameter, depending upon size. Write for Bulletin S-17. The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.

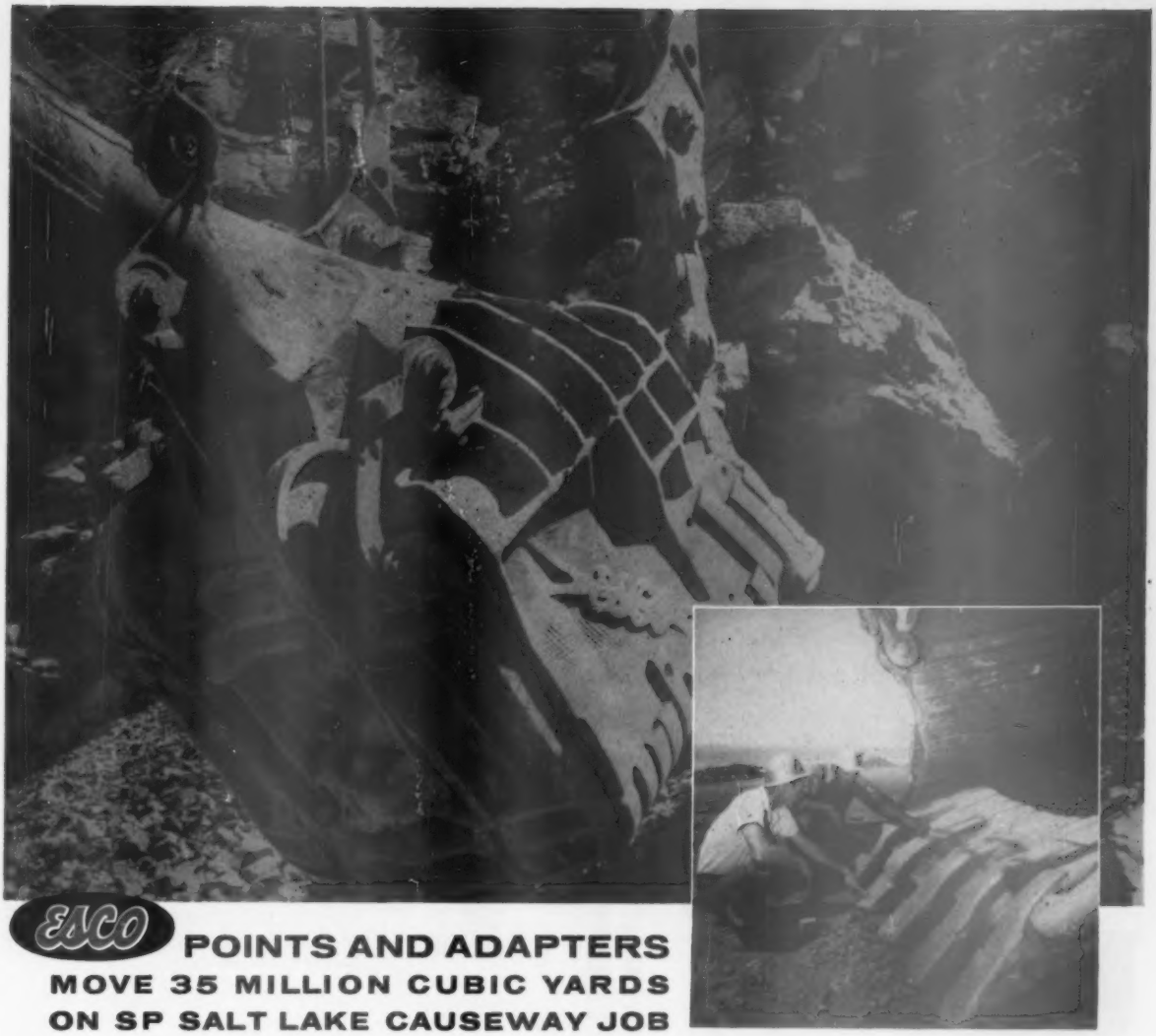
B&W

THE BABCOCK & WILCOX COMPANY

BOILER DIVISION

S-467

Enter 1283 on Reader Card



ESCO POINTS AND ADAPTERS MOVE 35 MILLION CUBIC YARDS ON SP SALT LAKE CAUSEWAY JOB

Shovel operators and mechanics, veterans in all types of rock excavation, say they have never experienced such severe digging conditions as the high silica content quartz being quarried by Morrison-Knudsen Company for the 13-mile long Great Salt Lake railroad crossing of the Southern Pacific Railroad.

ESCO points and wearcap adapters on M-K's dippers are quarrying the 35 million cubic yards of fill material for the mammoth causeway.

Increased point wear caused by this highly abrasive material makes the quick-change feature of *ESCO* points an important factor in keeping downtime to an absolute minimum. Easy-to-change *ESCO* points save at least half the time required in replacing bolt-on teeth.

ESCO Cast 12M Points and Adapters Cut Costs 4 Ways:

1. Quick-Change design reduces downtime. Four *ESCO* points can be removed, replaced in only five minutes.
2. *ESCO* points are quickly available for every digging tool from one convenient source.
3. Points feature self-sharpening design. There are eight point shapes to choose from.
4. Cast design permits extra metal at wear points. Points are heat treated, differentially hardened for long life.

See your nearest *ESCO* dealer. Ask for *ESCO* Tested Points Catalog No. 187.

ELECTRIC STEEL FOUNDRY COMPANY
2165 N. W. 25TH AVE. • PORTLAND 10, OREGON
MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.
Offices in Most Principal Cities
ESCO INTERNATIONAL, NEW YORK, N. Y.
IN CANADA ESCO LIMITED

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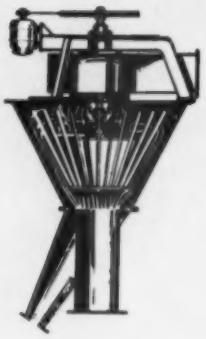
change from...

40 MESH

to

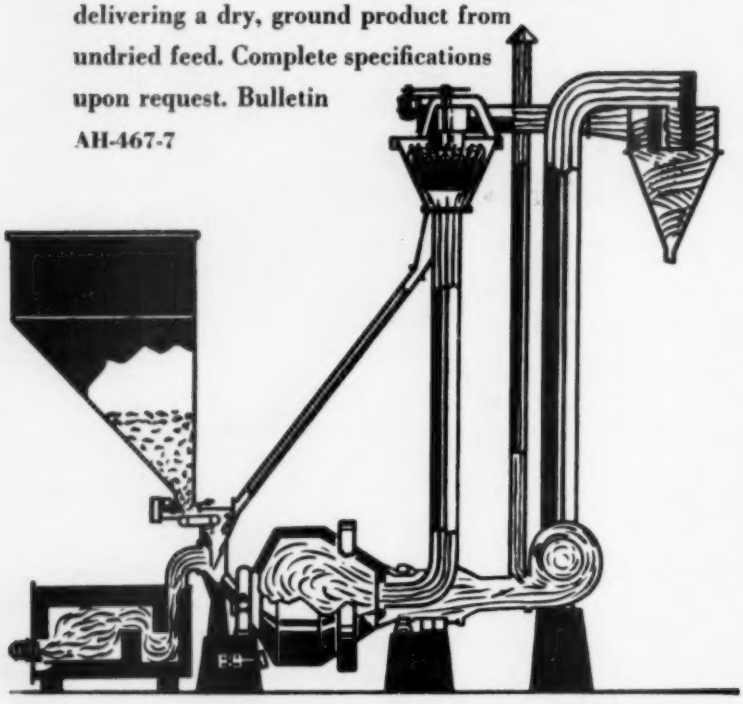
400 MESH



. . . in a few minutes, without interrupting operations. Yet any desired mesh may be maintained continuously. Ease of adjustment and close product control are possible with the . . .

"Gyrotor" Air Classifier

The Hardinge Gyrotor Classifier system, combined with a Hardinge grinding mill is an integrated grinding, classifying and product conveying system. Also available with an air-heating furnace for delivering a dry, ground product from undried feed. Complete specifications upon request. Bulletin AH-467-7



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COMPANY, INCORPORATED

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Enter 1244 on Reader Card

NEW LITERATURE

(Continued from page 135)

Belt conveyors

BARBER-GREENE CO. has released a new catalog describing its Redi-Fab belt conveyor series. The catalog shows how the various components are combined to provide the correct conveyor for every application. Every component and all accessories are illustrated, and their application and features are explained.

Enter 610 on Reader Card

'Jlo' air-cooled diesels

HERCULES MOTORS CORP. has published a 4-page bulletin describing its new line of lightweight, 2-cycle air-cooled diesel engines. The bulletin provides a detailed description of the 7-hp. 'Jlo-325' and 12-hp. 'Jlo-660' along with dimensional drawings, charts and sketches.

Enter 611 on Reader Card

Sand classifying tanks

MCLANAHAN & STONE CORP. has released a 4-page bulletin that explains all design and construction information on their new tanks. Also included are dimensional drawings and fine sand retention data for various tank sizes. The classification method is based on the different settling rates of various sand grain sizes.

Enter 612 on Reader Card

Type "D" roto-clone dust collector

AMERICAN AIR FILTER CO. has released a 20-page bulletin that provides complete product information about the application, principle, design, construction, operation and installation of the type D roto-clone dust collector. Ten illustrated pages describe hoppers, precleaners and aftercleaners. Charts and graphs give every bit of other needed information.

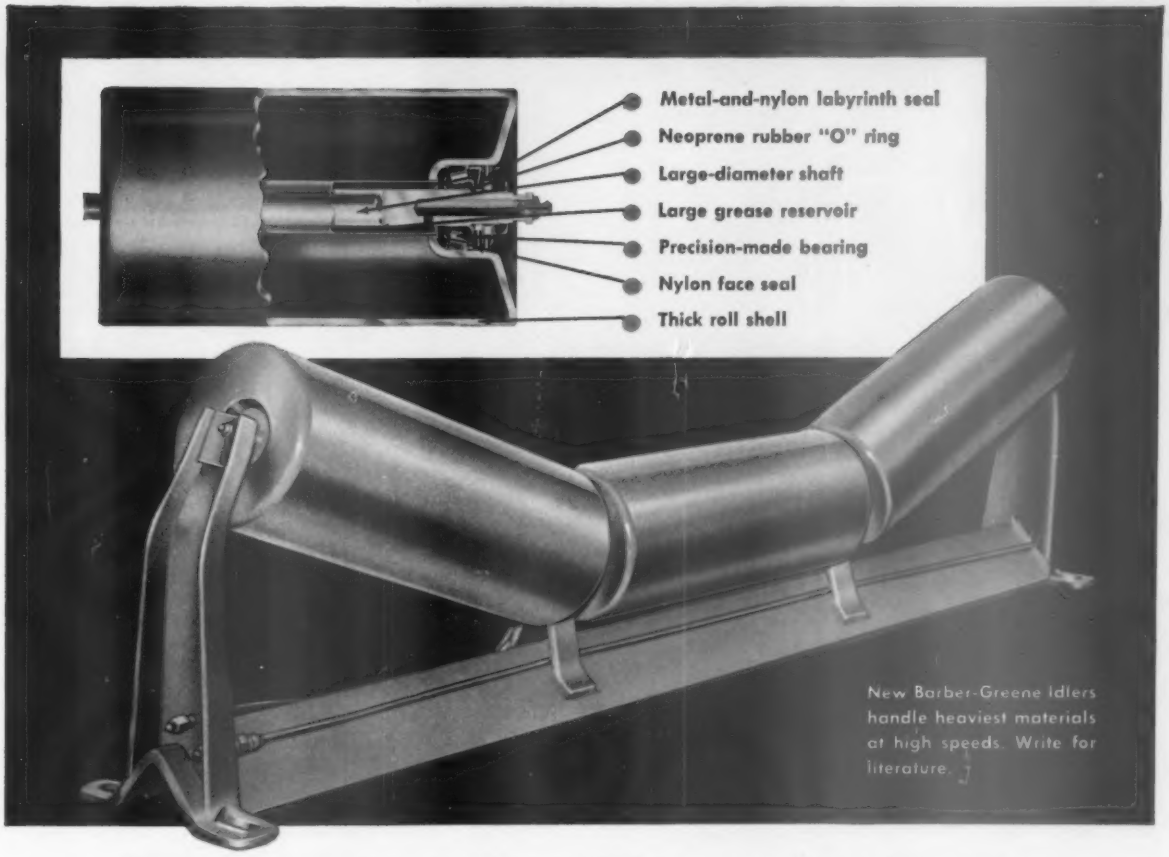
Enter 613 on Reader Card

Crawler, grader accessories

ALLIS-CHALMERS MFG. CO. has published Catalog MS-1189, which describes special equipment available for its crawler tractors and motor graders. Including such items as pusher plates, bucket seats, enclosed cabs and power take-offs, the accessories are designed to increase the versatility and working capabilities of the units.

Enter 614 on Reader Card

(Continued on page 140)


Metal-and-nylon labyrinth seal
Neoprene rubber "O" ring
Large-diameter shaft
Large grease reservoir
Precision-made bearing
Nylon face seal
Thick roll shell
New Barber-Greene idlers handle heaviest materials at high speeds. Write for literature.

Increase idler life with these new heavy-duty Barber-Greenes

Barber-Greene's famous line of belt conveyor idlers has now been expanded to include two entirely new series of heavy-duty units. Both series offer many revolutionary design improvements that assure longer life on every job. Both are built to handle large lumps and heavy materials at high speeds. These new series include a complete range of types for every application.

Important advantages are:

Revolutionary grease seals—The combination labyrinth and face seals are the most advanced in the industry. Made of metal and nylon, they seal grease in . . . dust and dirt out, allowing long lubrication intervals and lengthening bearing life. Neoprene rubber "O" rings effectively prevent moisture from entering bearing.

Rugged end brackets—Die-formed carbon-steel end brackets, twice as strong as castings of the same thickness, are ribbed for greater rigidity.

Precision-made bearings—Tapered roller bearings are precision-made to give many thousand hours of service.

Large-diameter shafts—Shafts, made of special-accuracy cold-drawn steel, up to 1¼″ in diameter. They are firmly anchored in stands by sturdy clamps and locking plates.

Virtually unbreakable stands—Jig-welded, all-steel stands maintain roll alignment despite the impact of large lumps. Heavy, inverted base angle is self-shedding. Heavy, formed steel feet up to ½″ thick.

Thick roll shells—Rolls made of heavy steel tubing up to ¼″ thick. Strong welds completely around roll ends assure rugged, long-life units. Roll edges ground smooth to prevent belt wear.

Large grease reservoirs—Rigidly fitted seamless steel tubing forms large grease reservoir, providing ample reserve which permits longer lubrication intervals.

59-9-1PE

Write for new bulletin.

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

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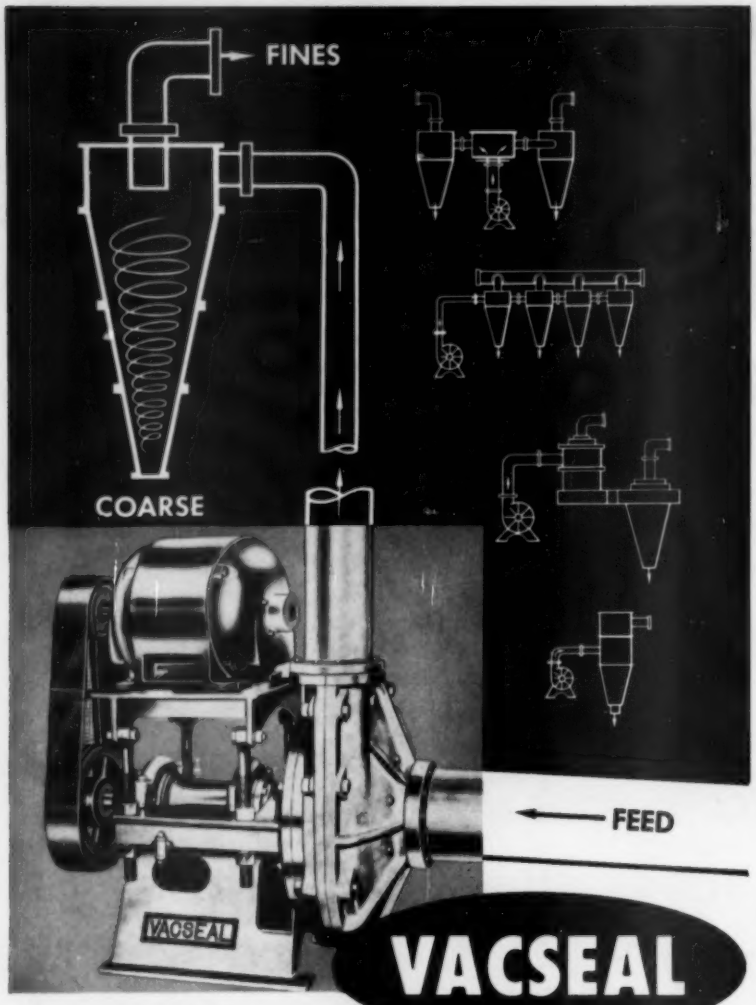

VACSEAL

The preferred pump for sand separation service

In the rapidly developing field of cyclone separation, VACSEAL is enthusiastically accepted as the dependable, efficient liquid-solid pump. It is now being successfully used in many industries, including: coal, sand, chemical and metallurgical as the essential feed unit for the cyclone method of size classification.

The versatile VACSEAL is available in natural rubber, Neoprene, hard iron or all alloy for effective handling of abrasives or corrosives. VACSEAL has the unique no-sealing-water feature. Users report over three years service handling 40% solids with no replacement parts required.

We invite correspondence and suggest you write today for literature that gives the reason why VACSEAL Pumps can meet cyclone feed requirements at low cost.

VP-516b

GALIGHER

CONSULTATION • ORE TESTING • PLANT DESIGN

Leaders in Experience and Service

GALIGHER PRODUCTS: AGITAIR® Flotation Machine, VACSEAL Pump, Geary-Jennings Sampler, Acid-proof Sump Pump, Geary Reagent Feeder, Laboratory AGITAIR® Flotation Machine, Laboratory Pressure Filter, Laboratory Ball Mill, Rubber Lined and Covered Products, Plastic Fabrication.

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Enter 1245 on Reader Card

NEW LITERATURE

(Continued from page 138)

Euclid S-18 scrapers

GENERAL MOTORS CO., Euclid Div., has published a 16-page folder on their model S-18 scraper with 21-cu. yd. struck capacity. This 3-color folder, Form No. 511, is well illustrated with cut-away and exploded views of major components. There is also an 8-page catalog, Form 151R4, on the model R-10 Euclid Rear Dump of 10-ton payload capacity.

Enter 615 on Reader Card

Explosive bags

BEMIS BRO. BAG CO. has issued an 8-page pocket-size booklet entitled "13 Questions and Answers," which illustrates and describes its Explosive Bag constructed of Flexiply. Flexiply is tubed around pinhole-free Red Line polyethylene. Included in booklet are methods of filling and closing bag, proper loading techniques, performance and cost data.

Enter 616 on Reader Card

Belt conveyor scales, control systems

TRANS-WEIGH CO. has published bulletin No. 24 which describes a complete line of equipment used for automatic process weighing and control. It can also be used for inventory weighing. The Belt-Meter system and how it operates are fully described.

Enter 617 on Reader Card

Remote weight recording

TOLEDO SCALE CO. has published an 8-page brochure that explains how their new units bridge the gap between the accurate indication on the dial and the use of the weight data at accounting control points by automatic weight data transmission. Systems described and illustrated include the Direct Digital Scanner and also the Direct Digital Selector.

Enter 618 on Reader Card

Stabilized base mixers

IOWA MFG. CO. has released an 8-page bulletin that explains two models of their base mixers. Included is a twin shaft unit that mixes 300 to 600 tons per hour of aggregate with a specified water additive, plus a smaller portable model that mixes up to 300 tons per hour.

Enter 619 on Reader Card

(Continued on page 144)

Enter 1246 on Reader Card

A longer-lasting REVERSIBLE cap and adapter...

Try this on-for SAVINGS!

Service-proved WEARPACT Cap Type Tooth —with foolproof retainer—cuts digging costs to record lows . . . even in taconite!

Probably by now you've heard of Wearpact Steel—the alloy with a combination of hardness and toughness not available in any other commonly used alloy.

Here's a new tooth and adapter design* cast in longer-wearing Wearpact . . . the ASF Cap Type Tooth and adapter that's reversible for longer life. Note that the tooth itself is self-sharpening. Keeps on *slicing* through the ore and overburden—and when finally worn, there's less metal to throw away. *The tooth locks securely to the adapter.* No ASF retainer has ever failed in service.

As for service life, the cost-per-ton figures in large mines speak for themselves. Lowest of any tooth on record! Give this dollar-saving tooth a try! Write today to arrange for an installation.

Cut your costs with WEARPACT

CAST ALLOY STEEL

A PRODUCT OF

AMERICAN STEEL FOUNDRIES

3800 Canal St., Indiana Harbor, Indiana

In Canada: International Equipment Company, Ltd., Montreal 1, Quebec

*Patent Pending.

WONDERWALL™ cuts bag costs up to 20% for Huber Corporation

"In just one of our critical shipping areas, we saved 20% in bag costs by switching to WONDERWALL", states Mr. E. M. Krech, Director of Purchases for J. M. Huber Corporation, Hillside, N. J., the largest producer of Kaolin clay in the United States.

"WONDERWALL bags have demonstrated their strength in resisting breakage under severest transit conditions. We reduce breakage and actually save money by using a WONDERWALL that is 40 pounds lighter in basis weight than our former natural kraft multiwall."

WONDERWALL is West Virginia's new, tougher multiwall that outperforms ordinary bags because it's made with Kraftsman Clupak* paper. It *stretches* and withstands punishment that breaks old-fashioned kraft. WONDERWALLS pack faster, handle easier, stack better —weigh and cost less.

See how the WONDERWALL can cut your bag costs too. Let a West Virginia representative show you. Write or call Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, N. Y.

West Virginia Pulp and Paper

*Clupak, Inc.'s trademark for extensible paper manufactured under its authority.

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The Standard of Comparison for UNIFORMITY

The alloying, forging and heat treating techniques used by Sheffield assure uniform quality. Fine, dense grain structure and the proved combination of hardness and toughness extend to the very core of a Moly-Cop ball. That's why Moly-Cops retain their spherical shape longer, save charging and down-time, and give you a better, longer grind at lowest cost per ton.

New steels are born at Armco

SHEFFIELD DIVISION

ARMCO STEEL CORPORATION

OTHER DIVISIONS AND SUBSIDIARIES: Armco Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

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HAYWARD CLAMSHELL BUCKETS

**WORK LONGER,
WORK FASTER,
WEAR LESS!**

Designed with rugged, one-piece alloy shells... wide type, cast manganese steel cutting edges... smooth shell interior for fast, capacity loads and easy discharge... manganese bushings... diagonal truss brace to keep shell in line... has no side sway or back lash... *plus many other cost-cutting design features!*

Get complete details. Write today for illustrated bulletin.

THE HAYWARD COMPANY

50 CHURCH STREET, DEP'T R, NEW YORK 7, N. Y.

Builders of Better Buckets Since 1888

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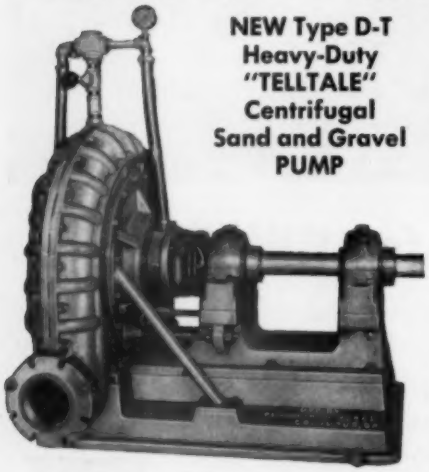
NO OTHER PUMP CLAIMS BETTER PRODUCTION THAN "TELLTALE"



NEW Type D-T Heavy-Duty "TELLTALE" Centrifugal Sand and Gravel PUMP

Reports of much greater "Telltale" production than pumps of the same size replaced at same spots and under same conditions are common. Reports of substantially greater production than replaced pumps of larger sizes are not rare.

AS LOW IN DOWNTIME AS IT IS HIGH IN PRODUCTION

"Telltale" is the only pump that warns when it's time to reline. Air sucked through periphery ports causes pump to lose its prime. Pumping stops. Water leaking through the ports signals that the shell liner and the surrounding belt of packing have worn through.

Available with either tough semi-steel or best-in-the-long-run Ni-Hard wearing parts in 4", 6", 8", 6 x 8" suction and 8 x 10" suction. Now available also in either alloy, 45 and 90° extra-heavy long-radius flanged elbows. Write for Type D-T Heavy-Duty folder and prices.

PEKOR IRON WORKS, INC.

ESTABLISHED 1892

LOCK DRAWER 909 FAIRFAX 2-4020 COLUMBUS, GEORGIA

Enter 1305 on Reader Card

NEW LITERATURE

(Continued from page 140)

Integral-shaft sheaves

ALLIS-CHALMERS MFG. CO. has issued Bulletin 20B7897B on its Vari-Pitch sheaves with integral shafts. The integral shaft means that the sheave can be mounted between two pillow blocks for flexibility in use and rigid support. The variable-pitch belt drives give infinite speed variations at modest cost.

Enter 620 on Reader Card

Wire rope recommendation handbooks

WIRE ROPE CORP. OF AMERICA has published a handbook compiled by their engineers. It gives wire rope users a complete, basic working knowledge of the characteristics of different wire ropes and slings. Indexed by its categories, the book is designed for engineers, contractors and builders.

Enter 621 on Reader Card

Nylon core belting

L. H. SHINGLE CO. has released a 12-page booklet entitled "The Story of Nylon Core Belting." Beginning with its inception in wartime Germany, the booklet tells the history of this new type of flat transmission belting. A description of how nylon core is made and reasons for its growing popularity are included.

Enter 622 on Reader Card

Grind mill techniques

BERNARD RELIN & ASSOCIATES, INC. has published a booklet entitled "How to Increase Grinding Mill Efficiency." Its eight pages offer practical information on grinding ball rationing and effects of the selection of the grinding ball on total grinding costs. Information covered includes the factors determining correct ball size choice and general method of rationing the make-up charge.

Enter 623 on Reader Card

Engines and power units

THE MATERIAL-HANDLING DIV., Allis-Chalmers Mfg. Co., has just published two catalogs on the G-226 and the G-149 engines and power units. Both catalogs, BU-528 and BU-531 tell the design, engineering and performance capacities of these units. Included are numerous illustrations.

Enter 624 on Reader Card **END**

29,000 lbs. - and all muscle!

Bring on those gruelling, earth-moving, profit-making jobs and just watch this mighty Dodge D800 dump truck clean them up.

It weighs in at 29,000 lbs. maximum G.V.W. It's big and tough. It's packed with power and the right equipment to get the job done in short order. Special transmission, if you need it—special axle, springs, brakes—whatever your kind of trucking requires.

Big-load hauling was never easier . . . never more profitable . . . than in new, improved '59 Dodge "Job-Rated" heavy-duty trucks with G.V.W.'s to 49,000 lbs., G.C.W.'s to 65,000 lbs.

Your Dodge dealer has full information. He'd like nothing better than to talk to you, and tell you why . . .

today,
it's real smart
to choose Dodge
Trucks

To provide maximum flexibility in loaded, off-road service and at unloaded highway speeds, a 4-speed auxiliary transmission is now offered for all conventional and tandem models in the Dodge 800 and 900 series. Another benefit for more truck buyers!

Enter 1299 on Reader Card

NEW U.S. PATENTS

OLIVER S. NORTH

Recently issued patents on nonmetallic minerals*

Cement

2,878,875—In a process for reducing the fluid loss and retarding the setting time of a **portland cement** slurry, a water-in-oil emulsion is mixed with the cement instead of water. (to I. R. Dunlap and F. D. Patchen; assigned to Socony Mobil Oil Co., Inc.)

2,879,052—Apparatus for producing **portland cement** in which a large proportion of the particles are properly burned. The mechanism has relatively large capacity for its size, and it can also be adapted to the production of **lime.** (to V. J. Azbe; assigned to Azbe Corp.)

2,879,982—Apparatus for drying and preheating a **portland cement** pulp and simultaneously precipitating dust from the kiln gases used for drying and preheating operations. (to L. A. Paley)

2,879,983—In a cooler for **portland cement** clinker, burnt **lime** or the like, the hot material is discharged from the kiln onto a layer of partially cooled material, and the composite bed passed through cooling air and then split. The completely cooled fraction is discharged to clinker bins while the partially cooled fraction is re-cycled. The supporting bed may be made of less expensive material than when hot material falls right to the bed. (to K. J. Sylvest; assigned to Smidth & Co.)

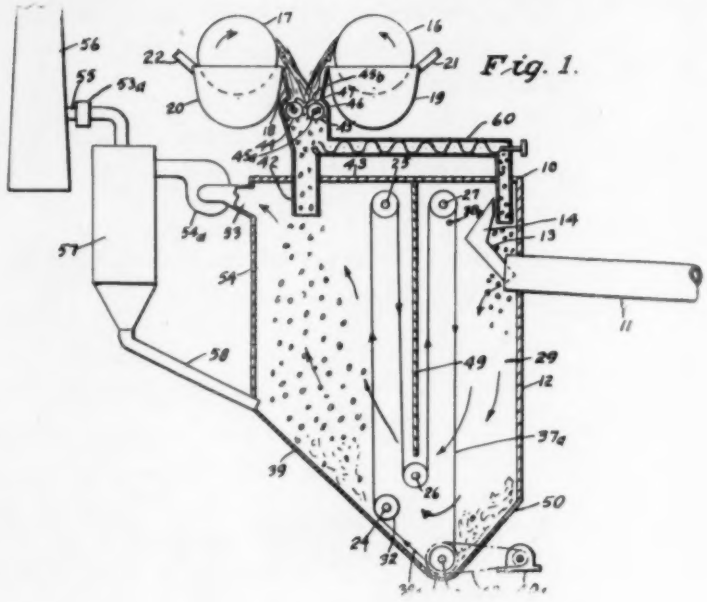


Diagram data of Patent No. 2,879,982

Fig. 1 is a sectional view through the apparatus. Hot gases enter chamber 10 from rotary kiln 11. Filter cake from filters 16 and 17 falls through hopper 18 and chute 42 to the relatively cool side of the chamber. As the dried slurry slides down sloping bottom 39 it is gathered into chain conveyor-mounted covered buckets and transported through the chamber for preheating, finally being discharged by trip pin 38b into kiln feed hopper 14. A part of the raw filter cake can be delivered direct to kiln via screw conveyor 60.

Kyanite

2,880,098—Composition and process for manufacturing a mullite refractory L-block for a sheet glass drawing apparatus. The raw batch used consists of plastic **clay,** calcined **kyanite,** flint, a grog, and water. (to R. E. Jones; assigned to Pittsburgh Plate Glass Co.)

Gypsum

2,877,599—Method of conditioning soil to accelerate seed germination and promote vigorous root growth. Pellets comprising carbon black, **gypsum,** and a fibrous organic material are applied to the soil. (to E. W. Hebestreet and J. T. Plunkett; said Plunkett assigned to said Hebestreet)

2,879,662—Method of fabricating an improved **gypsum** wallboard having perforated paper and a solid core. The perforate paper improves suction of the overlying plaster coat. (to J. J. Spinelli)

Miscellaneous

Canadian 572,338—In the manufacture of rigid thermal insulation products, **lime** and **diatomite** are mixed in water, ground to 150-mesh, and then mixed with a fibrous material, e. g. **asbestos,** and exfoliated **vermiculite** or expanded **perlite.** The composite material is molded, and the shapes treated in an autoclave to promote the lime-silica reaction. A dispersing agent, such as **bentonite,** may be added to the mixing water. (to E. C. W. Smith and J. D. Blakeley; assigned to Colchester Mineral Products Ltd. Mar. 17, 1959)

(Continued on page 148)

*Copies of United States patents are available at a cost of 25 cents each from The Commissioner of Patents, Washington 25, D.C. For convenience, coupons, each good for one copy of any patent, may be purchased from that official at the rate of $5.00 per 20-coupon pad or $25.00 per 100-coupon pad.

Enter 1201 on Reader Card

Only BAGPAKS® have a built-in insurance policy backed by International Paper

ACCIDENTS like this *will* happen. That's why International Paper plans for extraordinary stresses and strains when designing its Bagpak multiwall bags.

Only genuine *Gator Hide*® kraft, famous for toughness, is ever used in making Bagpak multiwalls. Quality is controlled every step of the way. International Paper can do this because it grows its own trees, makes its own paper, converts it into printed multiwall bags to your order. It also designs and builds *Bagpaker*® machines that can package up to 60 tons of material per hour!

When you buy Bagpak multiwall bags you get speedy shipments geared to your production schedules. *Twenty-one* sales offices and four strategically-located plants save you money by keeping your inventory at a minimum.

Only Bagpak multiwalls are backed by the full resources of International Paper—world's foremost pulp, paper and paperboard producer.

Next time your Bagpak field service engineer drops by, ask him what's new. He knows.

Bagpak Division **INTERNATIONAL PAPER** New York 17, N.Y.

NEW U. S. PATENTS

(Continued from page 146)

Diatomite

2,877,532—Method of making a fireproof acoustic tile from a mixture of **diatomite,** sawdust, and an aqueous dispersion of a glazing frit. The tile are formed and fired to 1,700-2,200 deg. F. (to H. W. Heine)

2,878,129—Use of **diatomite** in an elastic dental impression material. (to A. Rabchuk; assigned to Kerr Mfg. Company)

2,881,117—Although the process described here is directed mainly to the processing of oil shale, it is said to be adaptable also to the retorting of naturally-occurring California oil-impregnated **diatomaceous shale.**

Asbestos

2,865,079—**Asbestos-portland cement** piping joints are shaped in rigid molds having inflatable rubber cores which can assume, under pressure, the required shape. (to G. Marchioli and G. Gremigni).

2,868,641 — Process for preparing high strength beater saturated sheet materials, for example **asbestos** sheet. The latex rubber is deposited upon the fibers while the fibers are in aqueous suspension. (to D. A. Feigley, Jr. Assigned to Armstrong Cork Co.).

2,873,480—A composition suitable for molding into support members for use during curing of foundry cores comprises 10 to 70 percent by weight amosite or chrysotile **asbestos** fiber, **lime,** and a siliceous aggregate, such as **quartz, diatomite,** siliceous clay, etc. (to O. Ayers and M. Homiak. Assigned to Johns-Manville Corp.)

2,874,838—Method for recovering **asbestos** fiber from weathered dump tailings containing 1 to 8 percent short chrysotile fiber mostly in the fluffed state. An aerated aqueous suspension of the tailings is subjected to two-stage treatment in hydraulic drag classifiers, and finally passed over a shaking table. (to M. C. Pharo. Assigned to Johnson's Co. Ltd.)

2,875,075—A lightweight, high-temperature pipe insulating material is made by shaping and autoclaving a mixture of chrysotile **asbestos, lime, tripoli, diatomite, kaolin,** and calcium chloride. (to G. L. Kalousek. Assigned to Owens-Corning Fiberglas Corp.)

2,877,499—Method of making a material having high electrical resistance and good resistance to electric arc corrosion from a composition consisting of **asbestos,** MgO or Mg $(OH)_2$, and a non-fibrous filler. (to R. E. Wilkinson; assigned to Rostone Corp.)

2,878,133—An insulating stucco for walls and ceilings comprises 50 parts **white portland cement,** 50 parts **asbestos,** 15 parts hydraulic **lime,** and 10 parts activiated **bentonite.** (to A. Uccelli)

2,878,727—Method and apparatus for manufacturing from **asbestos** and **portland cement** hollow articles, such as pipe having bends or arms. (to C. Groot)

2,879,555—Fabrication of a composite structural unit consisting of an **asbestos** cement shingle and an insulating backer board. (to P. Dubecky; assigned to Johns-Manville Corp.)

2,880,090—Manufacture of a flexible, non-blistering surface covering consisting of felted coated **asbestos** fibers fixed to a polymerized vinyl halide resin composition. (to D. A. Feigley, Jr.; assigned to Armstrong Cork Co.) *(Continued on page 150)*

This high capacity Amplitrol "packaged" unit bolts directly to the hopper flange. Feeds to conveyors, crushers, screens, blenders, other process equipment.

"Feeder-Hopper Bottom Package" Reduces Design, Installation Costs!

For the first time a feeder is offered as part of a complete pre-engineered feeder-hopper bottom package. When you design with Carrier Amplitrol feeders, you merely design a hopper flange to bolt to the packaged unit. *This saves you both engineering design and installation costs!*

This preassembled packaged unit is built around the revolutionary new Amplitrol feeder — first mechanical vibrating feeder with variable, stepless control—and includes the hopper bottom, flanged hopper connection, skirt plates, regulating gate, isolation and suspension supports.

The feeder-hopper bottom unit is offered in two models—one for *high capacity* applications and one for *maximum control.*

Amplitrol's exclusive long-stroke drive handles higher capacities by automatically compensating for headload. This allows larger hopper openings, reduces bridging and hang-up. The simple, fast-responding pneumatic control system operates manually or in automatic response to any standard process instrumentation.

Send for new Bulletin No. 591 describing Amplitrol "package" in detail. Carrier Conveyor Corporation, 252-A North Jackson Street, Louisville, Kentucky.

CARRIER
"NATURAL-FREQUENCY" VIBRATING EQUIPMENT
Engineering Specialists in Vibrating Equipment

CONVEY ● FEED
DEWATER ● SCREEN
COOL ● AGGLOMERATE
DRY ● SCALP ● COAT
DISTRIBUTE ● ELEVATE
● FLATTEN BAGS

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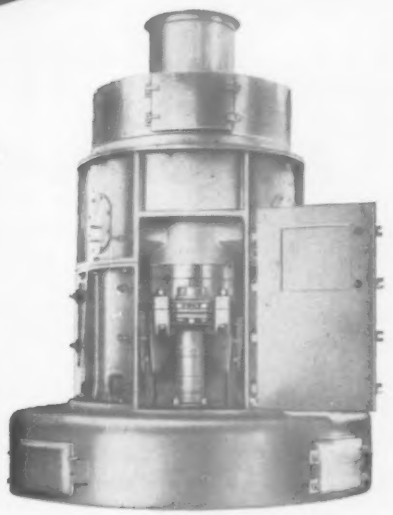
WHERE UNIFORM FINENESS IS DESIRED...
WHERE MINIMUM MAINTENANCE IS REQUIRED

The Bradley Pneumatic Hercules Mill provides uniform grinding of limestone, phosphate rock, etc. from 20 to 325 mesh. Its durable, non-clogging vibratory feeder practically eliminates manual feeding . . . allows continuous operation of the mill at its maximum capacity. And because the Bradley Pneumatic Mill is installed on a foundation flush with the floor line, it not only reduces foundation costs but simplifies inspection and maintenance. All grinding parts are also easy accessible . . . and both grinding die ring and roll assemblies can be removed without dismantling the mill. Add rugged construction to this, and you have a mill where dependable, uniform grinding is combined with an absolute minimum of replacements and downtime.

See Chemical Engineering Catalog or for complete information, write for Catalog No. 63



BRADLEY PNEUMATIC HERCULES MILLS

BRADLEY PULVERIZER CO.
superior grinding equipment since 1891

LONDON ALLENTOWN, PA. BOSTON

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NEW U. S. PATENTS

(Continued from page 148)

Aggregates

British 808,788—The properties of a granulated **blast-furnace slag** are improved by removal of the sulfur content, which is accomplished by allowing the molten material to fall as a fine spray through an oxidizing atmosphere. (to E. V. Perryer; assigned to The British Oxygen Co. Ltd. Feb. 11, 1959)

British 810,013—Vibratory, infrared apparatus for exfoliating **vermiculite,** wherewith the formation of furnace fines is minimized. (to S. Clipson; Mar. 4, 1959)

Canadian 572,679—Production of an improved exfoliated **vermiculite** product suitable for use in plasters and other applications. About 8 parts exfoliated vermiculite and 1 part mineral fiber, e.g., **asbestos,** are admixed with 3 percent of a dry, soluble cellulose ether binder. The ultimate particle is dry, large-grain, seal-coated, and granular. (to W. B. Chapman; assigned to Building Materials (British) Ltd. Mar. 24, 1959)

2,879,007—Economical apparatus for breaking up rocks to produce **crushed stone.** The stones are thrown against a breaker surface by cooperating, side-by-side pneumatic tires. (to D. C. Persyn and C. E. Holderbaum)

Clays

2,873,919—Apparatus and process for producing finely-divided inorganic pigment or filler material from **kaolin,** other types of **clay,** mixtures of sand and **feldspar,** etc. (to J. Behre and I. Williams. Assigned to J. M. Huber Corp.)

2,876,123—Shrinkage in concretes can be reduced by adding to the regular mix a small amount of a water-swelling colloidal clay, particularly **bentonite.** Alternatively, the bentonite can be pre-mixed with the portland cement at the cement plant. (to J. V. Drummond. One-fourth assigned to J. J. Shanley.)

2,877,125—Method for manufacturing an improved heat and air setting clay refractory. A preferred mix comprises 55 percent 8-mesh calcined **kaolin,** 27 percent 35-mesh calcined kaolin, 12 percent **ball clay,** and 6 percent dry sodium silicate. (to V. J. Duplin, Jr. Assigned to Babcock & Wilcox Co.)

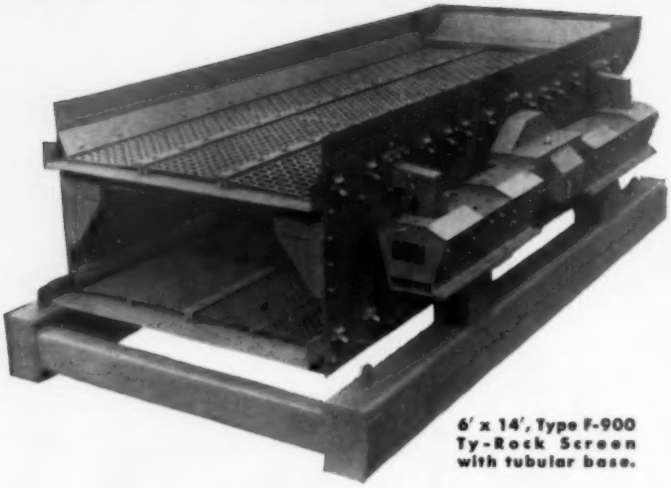
2,879,136—To produce a finely divided high bulking silica product useful as a rubber filler, etc., **kaolin** fines are digested in dilute H_2SO_4, partially evaporated, and the thickened slurry filtered, washed to remove $Al_2(SO_4)_3$, treated with concentrated H_2SO_4, and the resulting mixture evaporated to dryness, washed, and filtered. An $Al_2(SO_4)_3$-free silica is produced. (to W. T. Maloney; held by Mabel Maloney, executrix)

2,880,096—An oil well cement slurry is improved by adding thereto, or to the dry **portland cement** used, small amounts of an acid carboxyalkyl hyroxyethylated cellulose mixed ether and an alkali metal aluminate, along with considerable amounts of Wyoming **bentonite** or raw or calcined Lompoc **diatomite.** (to J. R. Hurley; assigned to Phillips Petroleum Co.)

2,880,102—An improved oil well cement slurry comprises hydraulic cement, **bentonite** or like clay, and sodium formate or similar salt. (to G. W. Woodard and C. L. Lunsford; assigned to The Dow Chemical Co.)

END

TY-ROCK SCREENS



6' x 14', Type F-900 Ty-Rock Screen with tubular base.

For TOP Performance

The balanced circle-throw action of the Ty-Rock plus the full-floating action on large shear type resilient rubbers enables this screen to separate material with unequalled speed and effectiveness.

The Ty-Rock wastes no power in useless, harmful racking of buildings or supporting members. It delivers all of the intense power to the job of stratifying and separating the sizes.

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THE W. S. TYLER COMPANY
CLEVELAND 14, OHIO
Manufacturers of Woven Wire Screens and Screening Machinery

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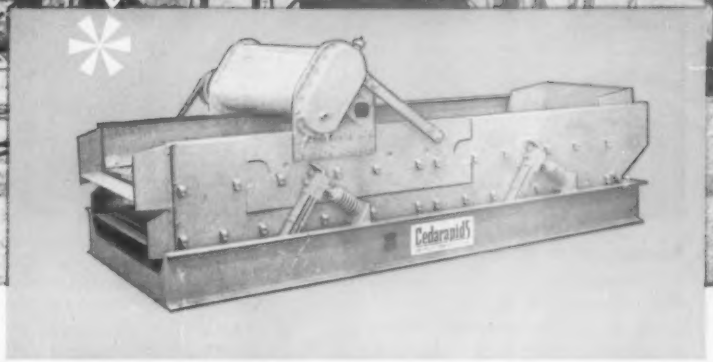
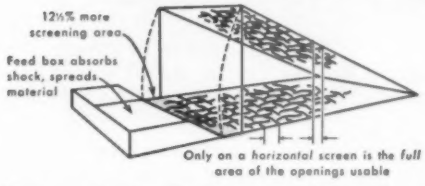
STILL FIRST CHOICE AFTER 23 YEARS



Here's why users prefer

CEDARAPIDS *HORIZONTAL* SCREENS


12½% more screening area
Feed box absorbs shock, spreads material
Only on a horizontal screen is the full area of the openings usable

Since any given length of screen provides maximum screening area when in a horizontal position, Cedarapids Horizontal Screens give as much as 12½% more screening area than an inclined screen of the same length. In addition, horizontal screen cloth openings are more nearly at a right angle to the fall of material and the full area of each opening is available for sizing. More material of the proper size goes through each opening, which means that size for size, Cedarapids Horizontal Screens give both higher capacity and more efficient gradation than is possible with an inclined screen.

Since way back in 1935, Cedarapids Horizontal Vibrating Screens have been the standard of profitable production. Because of their *horizontal* design, Cedarapids Screens give up to 30% greater screening capacity, assure more accurate gradation, and increase over-all plant capacity by their more efficient, snappy, live vibratory action. Because of their expertly engineered design and top quality construction . . . typified by fully stress-relieved boxes and screen frames . . . Cedarapids Screens have a long, trouble-free service life.

Today, Cedarapids Horizontal Vibrating Screens are the ONLY screens on the market with the high production performance and the low maintenance durability that result from Cedarapids' quarter of a century of practical, proved-on-the-job experience.

SEND FOR THIS NEW BULLETIN TODAY.
It describes the complete range of Cedarapids Screen models and sizes and explains the many exclusive features that help you increase your plant production . . . and profits.

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IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

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050N

NEW MACHINERY

Radical new truck

A REVOLUTIONARY new off-road hauler—heralded as the first all-new truck in a quarter-century has been announced. The truck is available in three sizes: 27-ton and 32-ton end dump models, and an 80-ton bottom dump model.

The units make up the "Haulpak" line, and feature rugged simplified design. They have no springs; four big pistons, acting like giant shock absorbers are used instead. Conventional axles have been eliminated; an exclusive "Hydrair" suspension system makes them unnecessary. There are no tie rods or exposed steering linkage. The entire steering system is protected within or above the frame line, giving Haulpaks almost twice the front-end ground clearance of conventional trucks.

The 27-ton model is powered by a 335-hp. turbocharged engine and operates at speeds up to 35.4 mph. The 80-ton bottom-dump is powered by a 450-hp. engine and operates at speeds up to 40 mph. All three units have torque converters which provide four forward ranges and two in reverse. *Le Tourneau-Westinghouse Co., Peoria, Illinois.*

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Kiln chain design

AN ECONOMICAL CHAIN SYSTEM for reduced operating and maintenance costs in wet process cement kilns, lime sludge kilns and wash mills has been announced. The new Spira-Loop chain system incorporates cost-saving design in a low-carbon steel chain. It is also available in alloy or stainless steels or any material that can be cold-formed.

Because the chain has more heat transfer surface, shorter lengths are needed to effectively dissipate heat. The chain's loop design eliminates concentrations of wear. Its inside diameter is always greater than twice its cross-sectional area, hence no kinking. It can be installed without end links or shackles and replacement links can be quickly added. *Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.*

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Blast recorder

IMMEDIATE VIBRATION-INTENSITY records and a meter indication are provided by a new portable blast vibration instrument. Blasters themselves can operate this field instrument to help control blasting within safe limits, according to the maker. It is easily demonstrated to homeowners to maintain good community relations. The instrument helps avoid costly delays and law suits, while the routine maintenance of records can provide an expert with valuable evidence with which to defend the blaster if litigation problems develop.

The instrument, known as the Blastcorder, indicates or records the peak acceleration of ground or structural vibrations. Knowing acceleration, blasters may either refer to the Bureau of Mines damage-safety index or derive an index based upon local practice.

The Blastcorder is self-contained, battery powered, protected by a tough Fiberglas case, weighs about 20 pounds, and is 6 x 12 x 19 inches in size. One, two, or three pickups may be used. Acceleration is retained by a memory circuit and indicated on the meter—the operator may then press a button to print the acceleration on the economical 4 x 6-in. record placed in the slot. Spaces are provided on the reproducible record for the blaster to enter operational data. *The Geotechnical Corp., P.O. Box 28277, Dallas 28, Texas.*

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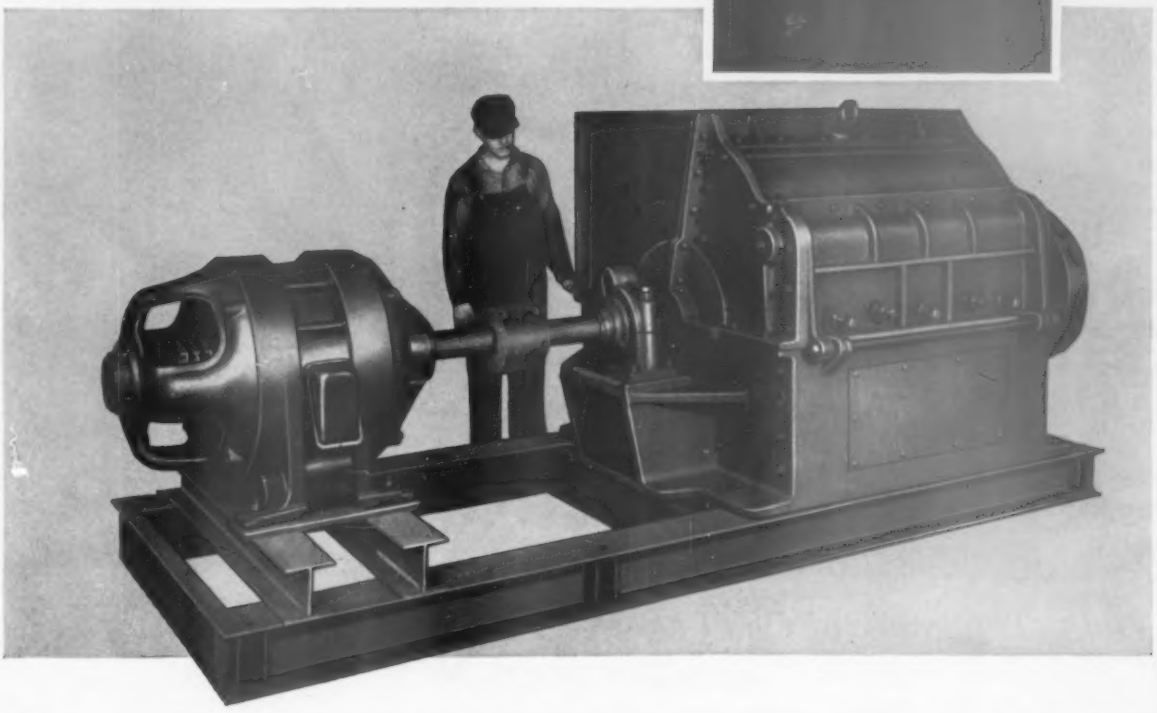
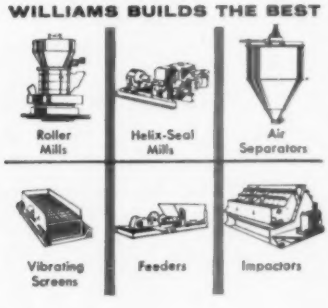
(Continued on page 156)

Complete size reduction... from start to finished product... in a single Williams Hammer Mill



Cut costs as much as 50% on production... up to 75% on equipment



In all normal crushing operations, a Williams heavy duty hammer mill can take most material and, *in a single pass*, reduce it to finished size! Production economies alone, in labor, power, maintenance, as well as stepped up output of better quality and more uniform products, will *cut costs up to 50%*.

Investment in original installations, *as high as 75%*, can also be expected. By making primary and secondary crushers unnecessary, a Williams hammer mill will eliminate all extra conveyors, drives, other equipment, special foundations and additional housing.

Williams hammer mills are built for daily rough and rugged service. Extra heavy manganese steel liners and breaker plates, oversize shafts, massive parts and reinforcements, all defy shock and wear, reduce downtime and replacements to nil.

If the cost price squeeze is one of your problems, get the facts about Williams hammer mills. *Write now for catalog.*

WILLIAMS
CRUSHERS GRINDERS SHREDDERS

PATENT CRUSHER & PULVERIZER CO.
800 St. Louis Ave. St. Louis 6, Mo.

Oldest and Largest Manufacturers of Hammer Mills in the World

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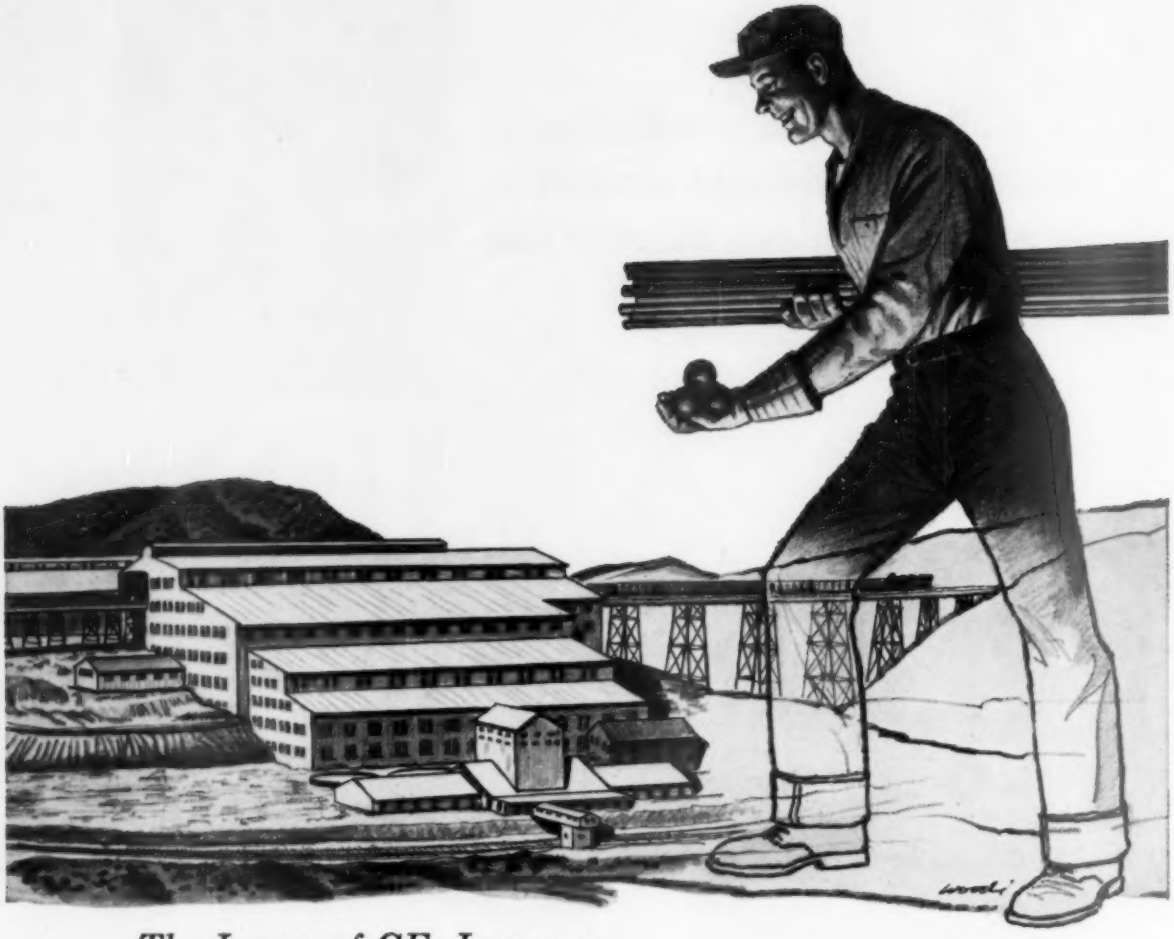

The Image of CF&I assures

quality steel Mining Products

This Image—the CF&I giant—stands for hundreds of dependable steel products used by many industries. And the CF&I name is prominent in the mining industry for such top-grade products as grinding balls and grinding rods.

For instance, the special analysis, hot-forged steel used in CF&I Grinding Balls gives uniform wearing qualities... high impact and abrasion resistance... maximum grinding efficiency.

CF&I Grinding Rods are hot-rolled from steel of special analysis, determined through years of experience to provide a hardness for high wear resistance, yet with a toughness to exclude bending or premature breakage. All rods are machine-straightened and their ends cut square so that they will freely rotate in the rod mill for better grinding.

We suggest you contact the nearest CF&I sales representative. He'll be glad to discuss your grinding problems with you, or give you complete information on all CF&I Mining Products.

OTHER CF&I STEEL PRODUCTS FOR THE CEMENT INDUSTRY

CF&I Grader Blades • CF&I Industrial Screens • CF&I Mine Rail and Accessories
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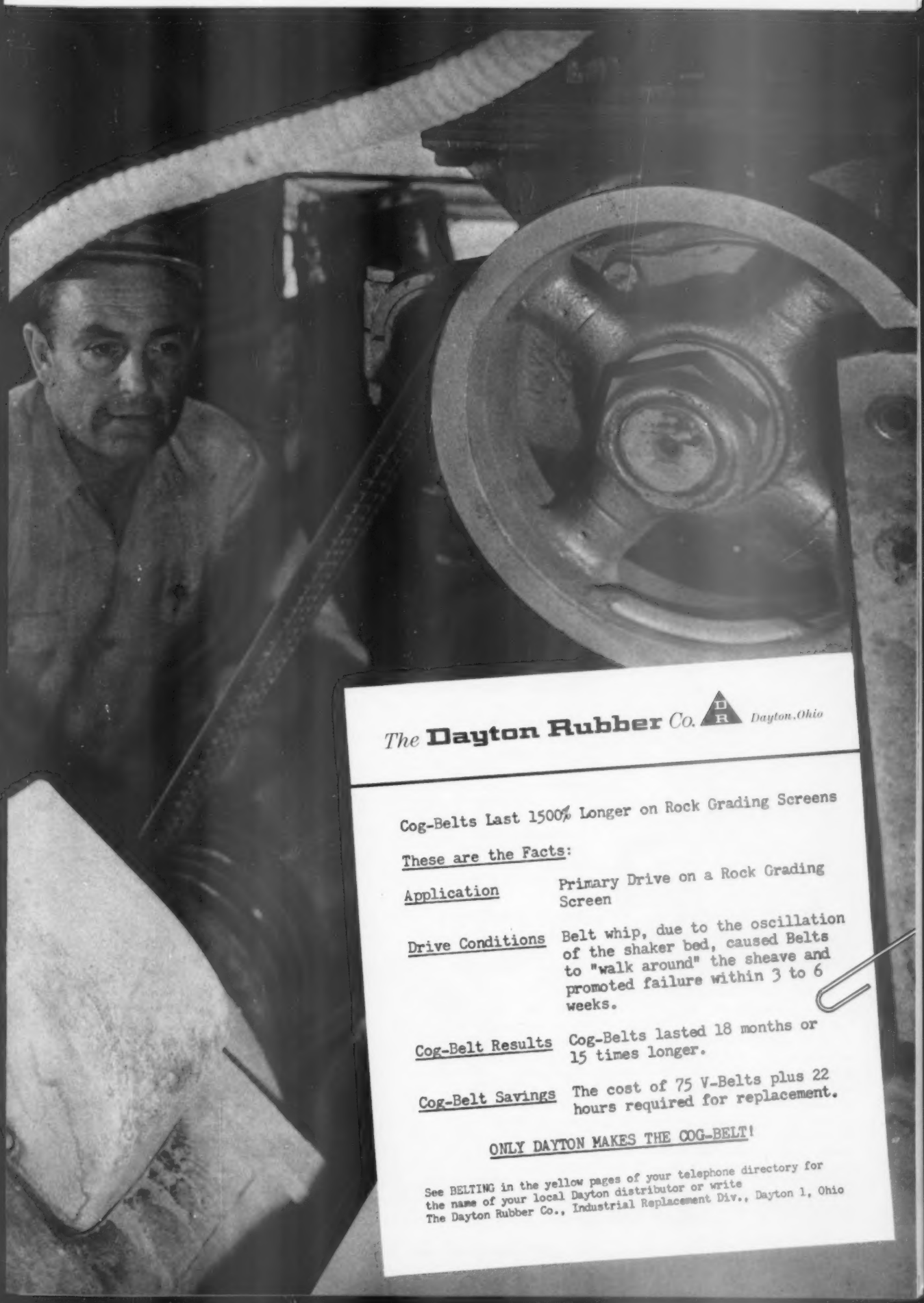


The **Dayton Rubber** *Co.* D R *Dayton, Ohio*

Cog-Belts Last 1500% Longer on Rock Grading Screens

These are the Facts:

Application	Primary Drive on a Rock Grading Screen
Drive Conditions	Belt whip, due to the oscillation of the shaker bed, caused Belts to "walk around" the sheave and promoted failure within 3 to 6 weeks.
Cog-Belt Results	Cog-Belts lasted 18 months or 15 times longer.
Cog-Belt Savings	The cost of 75 V-Belts plus 22 hours required for replacement.

ONLY DAYTON MAKES THE COG-BELT!

See BELTING in the yellow pages of your telephone directory for the name of your local Dayton distributor or write The Dayton Rubber Co., Industrial Replacement Div., Dayton 1, Ohio

NEW MACHINERY

(Continued from page 152)

Vibrating conveyor

A MECHANICAL VIBRATING conveyor moves solid granular materials, castings, sand and tramp iron uphill at inclines of 5 to 25 deg. The most outstanding feature of this unit is its patented "step-trough" design. Each one of hundreds of small "steps" in the trough catches the material on the downstroke to prevent it from slipping backward.

The trough design has resulted in higher capacities. The conveyor is also built to resist heat, abrasion, and impact. Maintenance and downtime have been kept to a minimum on this conveyor by combining a plate trough and natural-frequency drive, which has no moving parts or bearings except at the protected, heavy-duty drive. *Carrier Conveyor Corp., Louisville, Ky.*

Enter 203 on Reader Card

Diesel tractor

IDENTICAL IN APPEARANCE and size with other units in the manufacturer's line of tractors, this new unit will be a "mate" of the larger diesel tractor series introduced last spring.

The new tractor has an engine with displacement of 144 cu. in. and compression ratio of 16.8 to 1. The engine's efficiency, dependability and economy are attributed primarily to a direct fuel injection system and open combustion chamber design. *Tractor and Implement Div., Ford Motor Co., Birmingham, Mich.*

Enter 204 on Reader Card

New transit crane

A 45-TON MODEL designated the 30-B transit crane has been announced. The unit can lift a maximum load of 45 tons with a 40-ft. boom at a radius of 15 ft. The machine can be used as a 1 to 1½-cu. yd. hoe, 1 to 1¾-cu. yd. shovel, 1 to 1½-cu. yd. dragline and as a clamshell.

The new crane, which will reach 140 ft. with jib, has a boom fabricated of high tensile steel featuring extra-strong chord angles and larger cross sections.

Point sheaves are mounted on presealed, permanently lubricated antifraction bearings.

New features include an air-operated boom hoist and engine master clutch to complement the 30-B's air-control system, adjustable cone rollers and a carrier with gas or diesel engine. The carrier is especially designed and built so that the transit machine performs equally well in crane or excavator service.

Also featured on the new 30-B transit crane are a two-speed gear box, single-piece counterweight, heavier A-frame, hydraulic jacks and for machines with torque converters, two-lever dual governor control. *Bucyrus-Erie Co., S. Milwaukee, Wis.*

Enter 206 on Reader Card

Dry bulk transport features twin-screw unloading

A TWIN-SCREW unloading steel trailer is designed to haul all types of heavier dry bulk material such as cement and fly ash. The design of the new transport is said to permit bigger, more profitable dry bulk payloads, with heavy-duty construction for longer trailer life. The "clean bore" interior of the trailer's 60-deg. slope side walls assures positive flow to the twin screws and permits continuous unloading without material hang-up or bridging.

Twin dual-pitch, 9-in. diam. screws are each 28 ft. 6 in. long and have 6-in. pitch the first 20 ft. for power unloading of the trailer. Nine-in. pitch on the rear 8 ft. 6 in. length provides speed and assures maximum rate of delivery. The twin screws can be operated separately or together for selective unloading speed, with remote controls located at the rear of the trailer. The trailer is available in 640, 740 and 840 cu. ft. capacities. Customer units that meet individual customer requirements and hauling capacities will also be built. *Butler Mfg. Co., 7400 E. 13th St., Kansas City 26, Missouri.*

Enter 205 on Reader Card

Deep-hole drill has reverse rotation

A HEAVY-DUTY deep-hole hammer drill that utilizes conventional (left hand) rotation as well as reverse (right hand) rotation has been introduced. A selector incorporated into the backhead permits instant change of the rotation so that the power of the drill can be put to work for coupling or uncoupling steels—a very useful feature for efficient deep-hole work.

The new drill, designated the Model D40, has a 4-in. bore and handles bits up to 3 in. diam. It is designed to be used with self-propelled mountings, wagon drills, hydraulic booms and pipeline mountings.

Other extra features of the D40 include 6-pawl rotation and a closed fronthead. The locked-in 1½-in. shank-piece is designed to permit the use of heavier 1¼-in. hexagon carburized steel. The drill also has a larger ½-in., straight-through air-and-water tube that provides exceptional hole cleaning and faster penetration, according to the manufacturer. *Ingersoll-Rand Co., 11 Broadway, New York 4, N.Y.*

Enter 207 on Reader Card

(Continued on page 160)

3 to 10 times longer life!

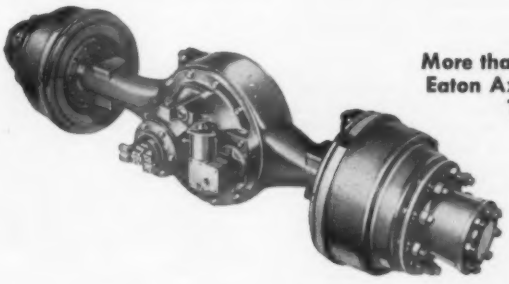
EATON INDUCTALLOY AXLE SHAFTS

Eaton Inductalloy Axle Shafts, hardened by the Eaton induction hardening process which produces an extremely hard case that extends deep into the material structure, are able to handle more pounds of torque without fatigue failure. The result is extra thousands of trouble-free miles added to axle life, more vehicle time on the road—less in the shop, and reduced maintenance expense.

The superiority of Eaton Inductalloy Shafts is performance proven by millions of miles of heavy duty operation. Ask your dealer for complete information.

EATON INDUCTALLOY SHAFT

ORDINARY AXLE SHAFT



More than Two Million Eaton Axles in Trucks Today

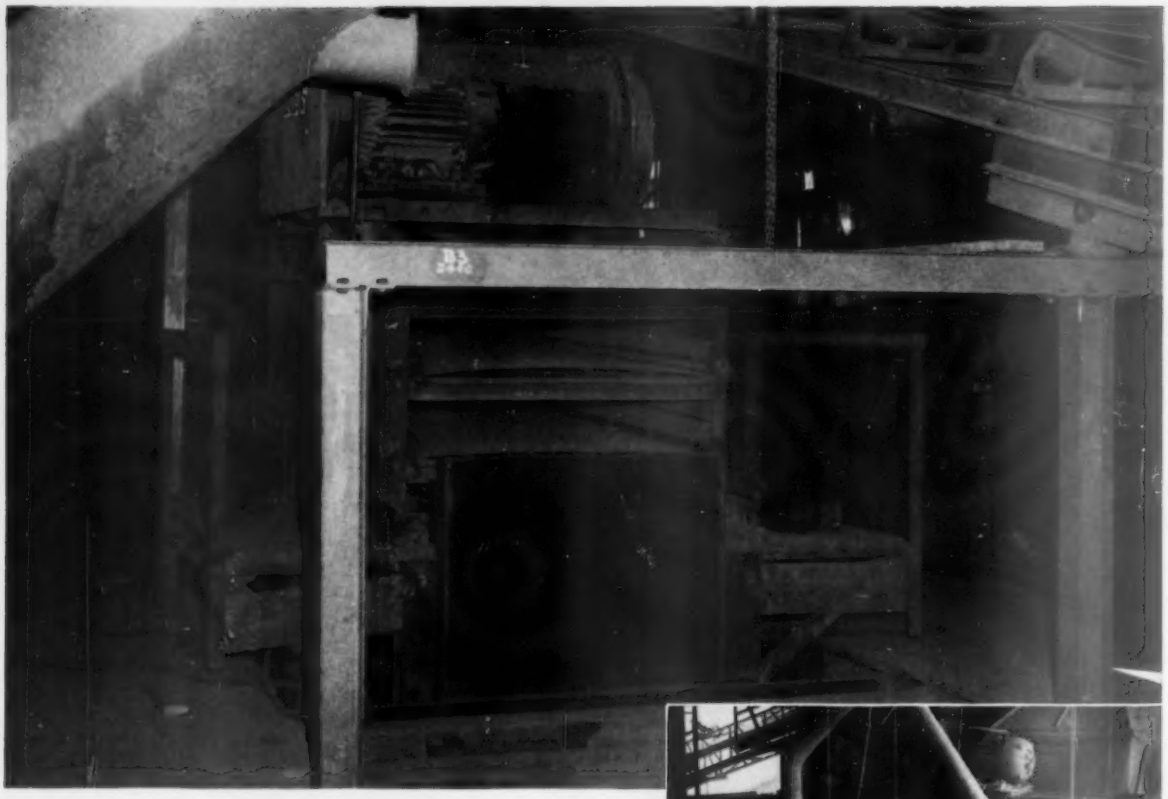
EATON

AXLE DIVISION

MANUFACTURING COMPANY

CLEVELAND, OHIO

PRODUCTS: Engine Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Hydraulic Pumps Truck and Trailer Axles • Truck Transmissions • Permanent Mold Iron Castings • Automotive Heaters and Air Conditioners Fastening Devices • Cold Drawn Steel • Stampings • Forgings • Leaf and Coil Springs • Dynamatic Drives and Brakes Powdered Metal Parts • Gears • Variable Speed Drives • Speed Reducers • Differentials • Centralized Lubrication Systems



Three-deck DEISTER screens 350 to 450 tons an hour . . . 2½ years on the job . . . *not one day of downtime!*

Houdaille Construction Materials, Inc. of Morristown, N. J. is one of the largest aggregates producers in the east with a total of 28 crushed stone, sand and gravel, ready-mix concrete and bituminous plants.

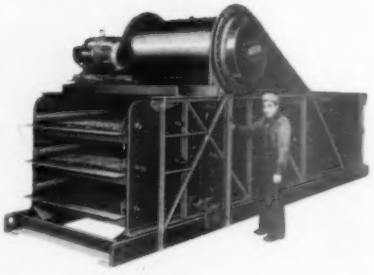
At three of Houdaille's stone crushing plants in New Jersey, nine Deister Vibrating Screens are helping keep production at peak capacity. The Bound Brook plant, for example, has five Deisters in continuous operation. One of these is a triple-deck 5' x 18' Type UF *horizontal screen*, handling a feed of 350 to 450 tons per hour. It has been screening out three sizes of coarse aggregates for 2½ years . . . with no breakdowns due to mechanical malfunction.

A few miles away in the company's Summit, N. J. plant, a two-deck 4' x 10' and a three-deck 5' x 10' have been giving excellent service for more than six years. Equally impressive is the performance record of a three-deck 5' x 10' Deister at Houdaille's Millington plant.

Richard Hixon, Bound Brook plant superintendent, says: "We've had nothing but good luck with our Deisters." E. A. Frentz, superintendent at the Summit plant, adds: "Except for an occasional bearing replacement [average bearing life is 8000 hours], our Deister Screens have given us no maintenance problems in six years of continuous operation."

Houdaille, like many other leading producers across the country, has learned from experience that Deister Screens provide maximum protection against downtime . . . maximum production to exacting specifications. If you're expanding or modernizing your plant, don't overlook this extra profit potential . . . standardize on Deister.

Above: Three-deck Deister Type UF Horizontal 5'x18' Screen at Bound Brook. *Inset:* Two double-deck 5'x14" Deister Type UHS Screens.



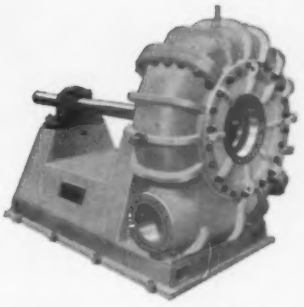
DEISTER MACHINE COMPANY
1933 East Wayne Street, Fort Wayne 4, Ind.

Enter 1300 on Reader Card

"He thought it was just another pump!"

NOW – MODERN THOMAS Durable

Dredge Pumps Dominate "home of sand & gravel" in Alabama



CAMPBELL SAND & GRAVEL COMPANY
TELEPHONE 3674
FLOMATON, ALABAMA

April 23, 1959

Thomas Foundry Company
Birmingham,
Alabama.

When one of my neighbors got hold of a Thomas Pump about 1951 I thought it was just another pump. Then when he got two more in the next year or two, I knew he must have something.

I decided to try one in 1954 and got another in 1956. With those two Thomas Pumps I got production equal to the three [redacted] Pumps that I had been using. I was even more surprised when each Thomas Pump used no more power than each of my old pumps but produced much more sand and gravel.

The Thomas Pumps are easier to work on and easier to line up and it can be done in less time and repair parts are cheaper because they last so much longer. You also give me mighty good service.

Now I have three Thomas Pumps and its easy to understand why Thomas Pumps have replaced almost all the other makes in this section. You can't beat the Thomas Pump.

Very truly yours,

Campbell Sand & Gravel Co.

Rufus Campbell

Rufus Campbell, Owner

Flomaton is one of the largest sand and gravel producing sections in Alabama, and 8 years ago one of the Flomaton operators installed a THOMAS Durable Dredge Pump— the modern solids pump, modern in design and made of modern abrasion-resistant material. It was then the only THOMAS pump in the Flomaton field where a dozen or more sand and gravel pumps of various makes were in use.

Today in 1959, THOMAS pumps dominate the Flomaton pits with a total of 75 to 80% of ALL makes of pumps in use there. Mr. Campbell explains in his letter herewith that in production two THOMAS pumps equal 3 pumps of other makes. He adds that a THOMAS pump uses less power, has lower maintenance cost, longer life, needs less repairs. Photo above shows Mr. Campbell and two of his three sons who are in business with him.

THOMAS Pumps and THOMAS Service go hand in hand— an unbeatable combination which proves over and over again the slogan: "You cannot buy at any price a more durable pump than a THOMAS for sand and gravel—you cannot buy one that will make you as much money." (Range of sizes is from 6-inch to 16-inch.)

THOMAS FOUNDRIES Inc.

P. O. Box 1111, Birmingham, Alabama

Enter 1311 on Reader Card

NEW MACHINERY

(Continued from page 156)

Ripper boot fractures material

A NEW "WING-FOOT" BOOT ATTACHMENT for heavy-duty rock rippers is now available. Designed for use with all-forged 24-in. straight ripper shanks, the wing-foot boot produces greater lifting and fracturing action in shale, sedimentary rock, paving and similar materials. It not only speeds up the ripping operation, but also shatters material more completely for easy scraper loading. It can be installed or removed without taking the shank off the ripper swing bracket. *American Tractor Equipment Corp., 9131 San Leandro Blvd., Oakland 3, Calif.*

Enter 208 on Reader Card

New truck line

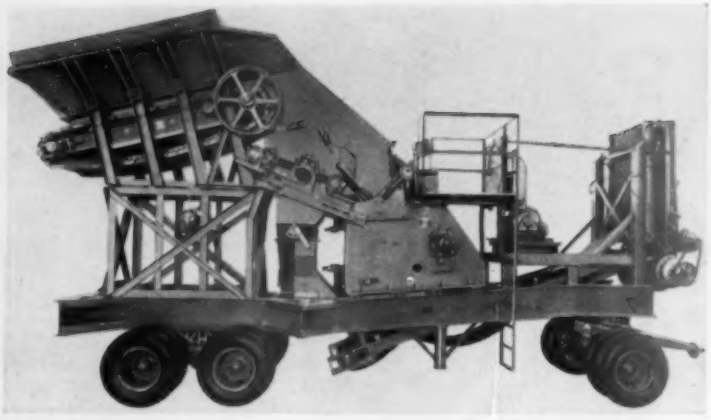
ADVANCEMENTS IN STYLING, power and pickup body design have been combined with a high degree of truck-to-job model specialization in a new line of trucks now introduced in the 4,200 to 33,000 lb. gross vehicle weight range, it has been announced. The over-all International truck line, claimed to be the most complete in the world, includes vehicles ranging from 3,800 up to 100,000 lb.

Designated the B-line, these new light, medium and heavy-duty trucks are available in four and six-wheel and all-wheel-drive chassis, with six-cylinder or V-8 engines and a wide choice of conventional and compact-design models.

Nine six-cylinder valve-in-head truck engines provide a lineup of high-torque standard powerplants unequalled in the industry. These six-cylinder engines are offered with horsepower ratings from 113 to 154. Five are gasoline fueled, and four are available with factory-installed liquefied-petroleum gas fuel systems.

Three new V-8 engines, with 266, 304 and 345 cu. in. displacements, are being announced as optional equipment through the B-line. *International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.*

Enter 209 on Reader Card



Portable primary crusher with heavy-duty apron feeder

USERS OF PORTABLE EQUIPMENT can now have the advantages of high capacity and low maintenance expense previously only available in stationary plants.

The new portable primary crusher unit includes a heavy-duty apron feeder, a two-deck vibrating grizzly and a jaw crusher. This assembly is mounted on a rugged fabricated steel frame to make a 12-wheel trailer.

When electricity is readily available, the unit is equipped with electric motors. A diesel engine can be used to drive the crusher and to generate current for other motors when other power is not handy. *Straub Mfg. Co., Inc., 8383 Baldwin St., Oakland 21, Calif.*

Enter 210 on Reader Card

Crusher-presizer

A NEWLY PERFECTED LINE of saw-tooth crushers is assembled from standardized blade, shaft, spacer, housing, drive and cleaner-comb components to achieve extreme ranges of process-adaptability with minimum special design.

The crushers are useful for presizing talc, asbestos, salt, shells, silica, alumina and phosphates before finish grinding and screening.

Maximum final material size is determined by saw-spacer clearance. This factor may be varied merely by changing spacer diameter and thickness. *Robinson Mfg. Co., 395 Allwood Rd., Clifton, N.J.*

Enter 211 on Reader Card

Bag tape

INDUSTRIAL USERS who package their products in pasted valve, multiwall bags will be interested in a new development just announced. It is a tape tear strip which opens the top of the bag quickly and easily and, at the same time, creates a handy pouring spout.

Called Unistrip, it consists of a flat, 5/32-in. wide tape held in place in the valve of the bag by a quick-drying adhesive. The length of the strip has been standardized at six inches. It can, however, be furnished in lengths up to 10 in. *Union Bag—Camp Paper Corp., 233 Broadway, New York 7, New York.*

Enter 212 on Reader Card

Stationary car shaker

A TRACKSIDE, permanently mounted car shaker for accelerated, push-button unloading of hopper-bottom railroad cars, entrain or singly, has been announced. The new hopper car shaker moves all types of bulk materials out of railroad cars, even those subject to extreme packing and bridging. Sand, gravel, limestone, ore, coal, coke and cinder, are a few of the many materials that can be quickly unloaded with this car shaker. It can handle 25 to 30 cars a day, according to the manufacturer. *Martin Engineering Co., Neponset, Ill.*

Enter 213 on Reader Card

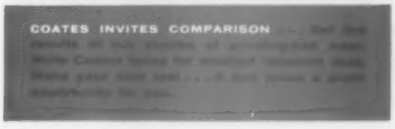
(Continued on page 162)

NEW TESTING TECHNIQUES PROVE CARBEX BALLS YOUR BEST BUY

Coates Carbex Triple-Forged Grinding Balls proved their durability and performance in a recent production run test. Using a newly developed scientific method of invisibly marking balls for positive identification, technicians charged a finish grinding cement mill with Coates Carbex Balls as well as other types. Ninety-eight per cent of the test balls were recovered after thousands of hours . . . laboratory inspection demonstrated conclusively that Carbex Balls, costing only a few cents per pound, performed excellently, showed little wear, gave more service per cost dollar.

Coates has continuously sponsored research to develop better grinding balls. The low cost, high-performance Carbex Triple-Forged Grinding Ball made of fine-grained, high carbon steel is specially forged to attain more perfect sphericity . . . heat treated to extreme hardness . . . toughened to stand stresses. Dollar for dollar, on a true cost basis, Coates proved better than the best.

CS59-2



Write for prices . . . All sizes ½" to 5" carried in stock for immediate shipment.

COATES STEEL PRODUCTS CO. CARBEX TRIPLE-FORGED BALLS

COATES STEEL PRODUCTS CO.

GREENVILLE, ILLINOIS

LARGEST EXCLUSIVE MANUFACTURER OF GRINDING MEDIA

Enter 1276 on Reader Card

CALWELD

the contractor's drilling rig!

Because it does so many jobs...

- —digs caisson pier holes
- —prepares belled footings
- —pre-bores concrete piles
- —provides big sub-soil samples
- —drills dry wells

...it drills any size hole from 1′ to 10′ dia. and 200′ deep.

...it excavates to a depth of 45′ in less than one hr.

...it travels fast from job to job.

...it sets up ready for drilling in minutes.

Write for the new Methods Manual, a 16-pg. booklet filled with job facts and methods.

CALWELD DRILLS

CALWELD, INC., 7222 E. Slauson Ave., Los Angeles 22, California

Enter 1259 on Reader Card

NEW MACHINERY

(Continued from page 160)

Pulley lagging

A PRACTICAL AND ECONOMICAL WAY to rubber-lag conveyor pulleys has been developed. In the new Minet lagging method, pulleys can be lagged without removal from the conveyor according to the manufacturer.

A wear and water-resistant sheet of Neoprene is cold-bonded to the steel surface of the pulley with an adhesive strength of 3,700 psi. No special tools are required, and the lagged pulley is is ready for service immediately. Lagging kits contain all material needed and are available for every pulley size. *General Splice Corp., 85 Spring St. South, Norwalk, Conn.*

Enter 221 on Reader Card

Heavy duty idlers

TWO NEW SERIES of heavy-duty units have been added to this company's line of belt conveyor idlers. These new idlers, 6 and 7 in. diam., are designed for long life and continuous operation while handling large lumps and heavy loads at high speeds for belt widths from 18 to 60 in.

Both series include precision-made tapered roller bearings with large shafts, heavy rolls, rugged stands, and a new nylon and steel grease seal. A complete range of types is offered in each series, including standard troughing idlers and return rolls, rubber impact idlers, picking table idlers, flat belt idlers, self-aligning idlers and return rolls, chevron-rod and rubber-tire return rolls and deep-trough idlers. *Barber-Greene Co., Aurora, Ill.*

Enter 222 on Reader Card

(Continued on page 170)

PRESTRESSED!

Quaker Thermoid Conveyor Belting keeps rolling with the punches

Before it ever comes to you, the heaviest tension you'll put on Thermoid-Quaker Conveyor Belting has already been built in—and then released *after* curing. So the rubber and fabric are really in *compression* when you put the belting to work—ready for the toughest pull without overstraining the yarn or the cover.

There's a Thermoid-Quaker belting designed with just the combination of properties you need for each conveying job. To get the right belting for *your* needs, talk with the Thermoid industrial distributor nearest you, or write to *Thermoid Division, H. K. Porter Company, Inc., Tacony & Comly Sts., Philadelphia 24, Pa.*

Notice how the special ply construction of Thermoid-Quaker "VICTOR" Belting provides greater flexibility at the edges—more shock-absorbing rubber where the worst beating occurs.

THERMOID DIVISION **PORTER** **H.K. PORTER COMPANY, INC.**

PORTER SERVES INDUSTRY: with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION; Copper and Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION; and in Canada, Refractories, "Disston" Tools, "Federal" Wires and Cables, "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD.

Enter 1214 on Reader Card

News Reports from Operators Reveal Stamina of SECO Twin Bearing Screens

Now, you can expect and get a new kind of stout-hearted performance from 2-bearing screens.

That is, if they are SECO TWIN BEARING screens. Yes, actual results, reported to us by producers themselves, give strong proof that SECO design and engineering superiority really pay off . . . day after day, year after year where it counts . . . on the job. Today, with your own profits so dependent on operational efficiency, we believe it will pay you to get the full information about SECO TWIN BEARING screens.

"Over 1,000,000 tons without a whimper from our SECO TWIN BEARING screens" reports Jules Koczat of Buffalo Crushed Stone Corporation. "We've screened eight sizes of aggregate for 1½ years without a minute of downtime. We are so pleased we now have seven SECO TWIN BEARING screens on the job."

"We like the action and performance of this screen." Joe Schwendt, Sup't., Amico Sand & Gravel Co., Riverside, N. Y.

"This screen is a real screener. Elmer is very happy with it, and says they will be ordering more of them in a month or so." R. P. Fulton, Southern Machinery & Supply Co., Roanoke, Va.

"This sieve analysis is a real endorsement for SECO TWIN BEARING screens." K. K. Kagarise, General Sup't., The Standard Slag Co., Youngstown, Ohio.

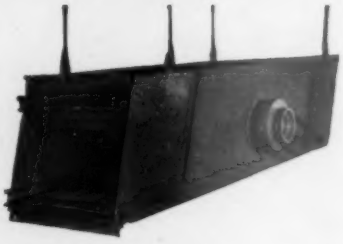
"Our SECO TWIN BEARING screens are doing a real good job of screening. Our only replacement has been screen cloth." Paul Padgett, Purchasing Agent, Thompson, Weinman & Company, Sylacauga, Alabama.

"I never believed a 2-bearing screen could perform like this." We're averaging 120 TPH in three sizes of gravel plus concrete sand . . . with no trouble at all on our 3 x 10 Triple Deck model." Eric A. Krehbiel, President, Clarence Sand and Gravel Corp., Clarence, New York.

Designed for Volume Low Cost Screening

SAND • GRAVEL • CRUSHED STONE • CINDERS • SLAG and AG-LIME

Single, double, triple and half deck variations. May be suspension or base mounted.



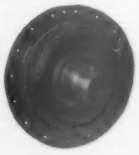
RIGID BOX FRAME CONSTRUCTION

Eliminates body distortion thus preventing undue stress on shaft assembly.

20%-30% HEAVIER AND STRONGER SHAFT

The heart of the screen, precision built with an extra margin of safety and with extra heavy bearing, too!

OIL BATH BEARING LUBRICATION



Provides more thorough lubrication for longer bearing life. Special flinger type seals prevent oil entering the tube assembly.

SECO
TRUE CIRCULAR ACTION
VIBRATING SCREENS

SEND FOR BULLETIN TB-21

SCREEN EQUIPMENT CO., INC., BUFFALO 25, N. Y.

Enter 1297 on Reader Card

Enter 1298 on Reader Card

Digging iron ore on the Mesabi Range near Aurora, Minnesota.

MARION 151-M—Power For Unmatched Digging in Mines and Quarries

A Marion 151-M in action is a familiar sight in many parts of the iron range, in copper mines, coal pits and quarries throughout the world. This 7-yard machine is ruggedly built throughout with ample power for continuous, high-speed production. It is readily convertible to dragline service with boom lengths from 80′ to 120′ and buckets from 4 to 8 yards.

A 40-ton Marion 43-M truck crane loads 69,000 pounds at 13 feet. Such standard features as a torque converter, Marionair Control, power raising and lowering of the gantry and ballast give the operator big advantages. The strong, highly mobile carrier provides maximum maneuverability during travel and on the job.

Consult Marion Mining Specialists for lower costs on your property.

MARION

MARION POWER SHOVEL COMPANY—MARION, OHIO, U. S. A.

A Division of Universal Marion Corporation

A THUNDERSTORM FIVE MILES AWAY...

Will it hold you up or blow you up?

Under certain conditions, a thunderstorm five miles away can be the source of extraneous electricity that *could* result in a premature blast.
This hazard is so well recognized that blasting operations are often suspended whenever a thunderstorm is detected.

There is a simple, commonsense method of reducing this lost time while minimizing the hazard of premature shots. Use Primacord as the "down line" to detonate the charges in each hole – and as "trunk lines" to connect all holes.

Primacord is a *detonating* fuse. It cannot be set off by sparks or normal vibration – and even a direct hit by lightning failed to detonate it. Its use simplifies loading, and will enable you to plan your blasts to obtain better fragmentation.

When all is in readiness for the blast then, *and only then,*
attach fuse and cap or electric blasting cap to the end of your trunk line.
With Primacord, you call the shots!

THE ENSIGN-BICKFORD COMPANY, Simsbury, Connecticut
Since 1836

USE

GUARD AGAINST STRAY CURRENT HAZARDS

Primacord®
DETONATING FUSE

P-1

Enter 1275 on Reader Card

MONEY MAKING IDEAS FOR YOU - - - FREE

USE THESE CARDS FOR MORE INFORMATION ON:

1. **Advertised Products**
2. **New Machinery**
3. **New Literature**

How to use:

Each advertisement in this issue is provided with a key number, so is each new machinery and new literature item. For more information on any of these items simply fill in the key numbers in the appropriate space on the adjoining card and send it to us. We'll do the rest.

BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

FIRST CLASS
PERMIT NO. 1417
CHICAGO, ILL.

– POSTAGE WILL BE PAID BY –

ROCK PRODUCTS
79 WEST MONROE ST.
CHICAGO 3, ILL.

READER-SERVICE CARD RP-6-59

ROCK PRODUCTS 79 W. Monroe St. | **JUNE, 1959** Chicago 3, Illinois | Cannot be serviced after August 1, 1959 postmark.

Please print or type

Name_____ Position_____

Company (In Full)_____

Company Address_____ City_____ Zone____ State_____

MAIN PRODUCT OF PLANT_____ CAPACITY_____

[THIS INFORMATION WILL HELP US GIVE YOU MORE COMPLETE SERVICE.]

Send information on items identified by key numbers beside or below items of interest to you. List your choice in numerical order. Limit 10 per card.

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(6) ..... (7) ..... (8) ..... (9) ..... (10) .....

IF NO KEY NUMBER, USE COMPANY NAME

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1. **Advertised Products**
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Ask your Allis-Chalmers dealer to show you **"...And a Great Deal More"**

SINGLE-LEVER speed and direction control makes it easy for operator to work fast

If a loader operator has to move one lever for forward and reverse, and another lever to get into a higher working gear, chances are he's going to stay in low gear.

Recognizing these limitations on your achieving faster loading, Tractomotive developed Single-Lever speed and direction control to speed up the work cycle. It's on the big TL-20 TRACTOLOADER*, the TL-16 and TL-14.

With Single-Lever control, the operator will naturally choose his fastest possible working gear every time he shifts. He can go into second gear just as easily as first—and get there on the double. Moreover, when there's loading to be done down the road or across the pit, he power-shifts right into high (road speed), and does the job in a hurry.

Let your Allis-Chalmers dealer show you how this exclusive One-Lever control of speed and direction alone will add many extra yards to your daily production.

Other TRACTOLOADER working advantages include: Longer Reach; Strong, Pin-Connected Planetary Axles; Extra Stability; Safe Dump Cylinder Location; Extra Hydraulic Protection; Hydraulic Torque Converter Drive; Tip-Back Bucket; "Hi-Traction" Differentials; Power Steering; Ignition Key-Type Starting; 4-Wheel Power Brakes; 6-Way Adjustable Seat; Rear-Axle Disconnect; Bucket Position Indicator.

*TRACTOLOADER is a registered Tractomotive trademark.

ALL TRACTOMOTIVE EQUIPMENT IS SOLD AND SERVICED BY YOUR ALLIS-CHALMERS DEALER

TRACTO—
a sure sign
of modern design

TRACTOMOTIVE
TRACTOMOTIVE CORPORATION • DEERFIELD, ILLINOIS

TRACTOLOADERS • TRACTOSHOVELS • TRACTORIPPERS • TRACTOHOES • TRACTOSIDEBOOMS

Enter 1223 on Reader Card

NEW MACHINERY

(Continued from page 162)

New ¾ cu. yd. shovel-crane

COMPLETELY NEW from base to boom is the ¾-cu. yd., 12½ to 30-ton capacity, shovel-crane just announced.

The new LS-78 unit reflects new engineering from base to boom. Many exclusive design concepts that have been proved for years on other models in the series have been adapted to full ¾-yd. service. The result is a completely new machine with no component interchangeability with larger or smaller models. *Link-Belt Speeder Corp., 1201 Sixth St., S.W., Cedar Rapids, Iowa.* **Enter 214 on Reader Card**

Variable-speed pulley

A NEW VARIABLE-SPEED PULLEY is now available to provide ratios up to 3 to 1 at 3⅓ hp. at 1,150 rpm. or 5 hp. at 1,750 rpm. Easily and quickly installed on old or new drives, the pulley changes speed instantly with just finger-tip pressure while the machine is in motion. Both pulley faces move simultaneously and equally to give constant belt alignment—each side independently actuated by its own spring. Curved pulley faces maintain full contact with belt sides at all times to provide maximum efficiency.

Known as the No. 3050 Variable Speed Pulley, it uses a 1 13/16-in. top width variable-speed belt. Standard bores are 1, 1⅛, 1¼ or 1⅜ in. *Lovejoy Flexible Coupling Co., 4938 W. Lake St., Chicago 44, Ill.*

Enter 215 on Reader Card

Portable conveyor loader

HIGH PRODUCTION LOADING, up to one cu. yd. of material a second, is possible with the new 60-in. "Pitloader." The new conveyor loader can be used for one-man loading of trucks with gravel, rock and sand.

Now in production the "Pitloader" line also includes 36 and 42-in. portable models. Model size is determined by the width of conveyor belt that carries the material to hauling units.

Job installation of the unit is quick and easily handled. Heavy construction allows skidding without dismantling when short work-area changes are made. The 36 and 42-in. models, mounted on rubber tires, can be made ready for travel to new locations within minutes. *Koehring California Co., Stockton 4, Calif.*

Enter 216 on Reader Card

Cement transfer plant

A 500-BBL.-PER-HOUR capacity bulk cement transfer plant, designed to need a minimum of maintenance, has been introduced. The plant provides an economical and convenient method of transferring bulk cement or similar bulk material from hopper cars to trailer or dump trucks.

Easily transported, the plant is readily erected on a timber mat and is braced with guy wires. Only minor excavation is required for set-up. It can also be erected without guy wires by bolting to a reinforced concrete mat.

Bulk material is carried from the bottom of the hopper car by a 12-in. diam. screw conveyor. The elevator chain carries 16 x 8-in. welded steel buckets at 16-in. centers. Spout for loading into trucks is made of 12-in. diam., corrosion-resisting steel and includes a canvas shroud. *C. S. Johnson Co., Champaign, Ill.*

Enter 217 on Reader Card

Heavy-duty power units

FOUR NEW V-TYPE industrial power units include sheet metal housing and instrument panel, electrical system, radiator assembly, skid-type mounting. They are built around the maker's 330-cu. in. 6-cyl. diesel engine and the three big new gasoline engines of 401, 477 and 534-cu. in. displacement. Compactness, durability and ready parts and service are advantages given for the power units. All are available with special attachments — transmissions, torque converters and SAE housings for customized installation. *Ford Div., Ford Motor Co., P.O. Box 608, Dearborn, Mich.*

Enter 218 on Reader Card

Jig control

AUTOMATIC DENSITY DISCHARGE CONTROL for jig hutch products is provided with a valve now in production. The unit, which is attached to the hutch, consists of a housing and a diaphragm-operated valve. The diaphragm keeps the valve closed due to water pressure against the larger area of the diaphragm.

When enough solids are accumulated to overcome the differential in pressure, the valve opens and discharges at 70 to 80 percent solids. When the solids have been discharged, the pressure of water against the diaphragm again closes the valve. This valve operates automatically without power or manual control. No water is wasted because only high-density pulps are discharged. *Denver Equipment Co., P.O. Box 5268, Denver 17, Colorado.*

Enter 219 on Reader Card

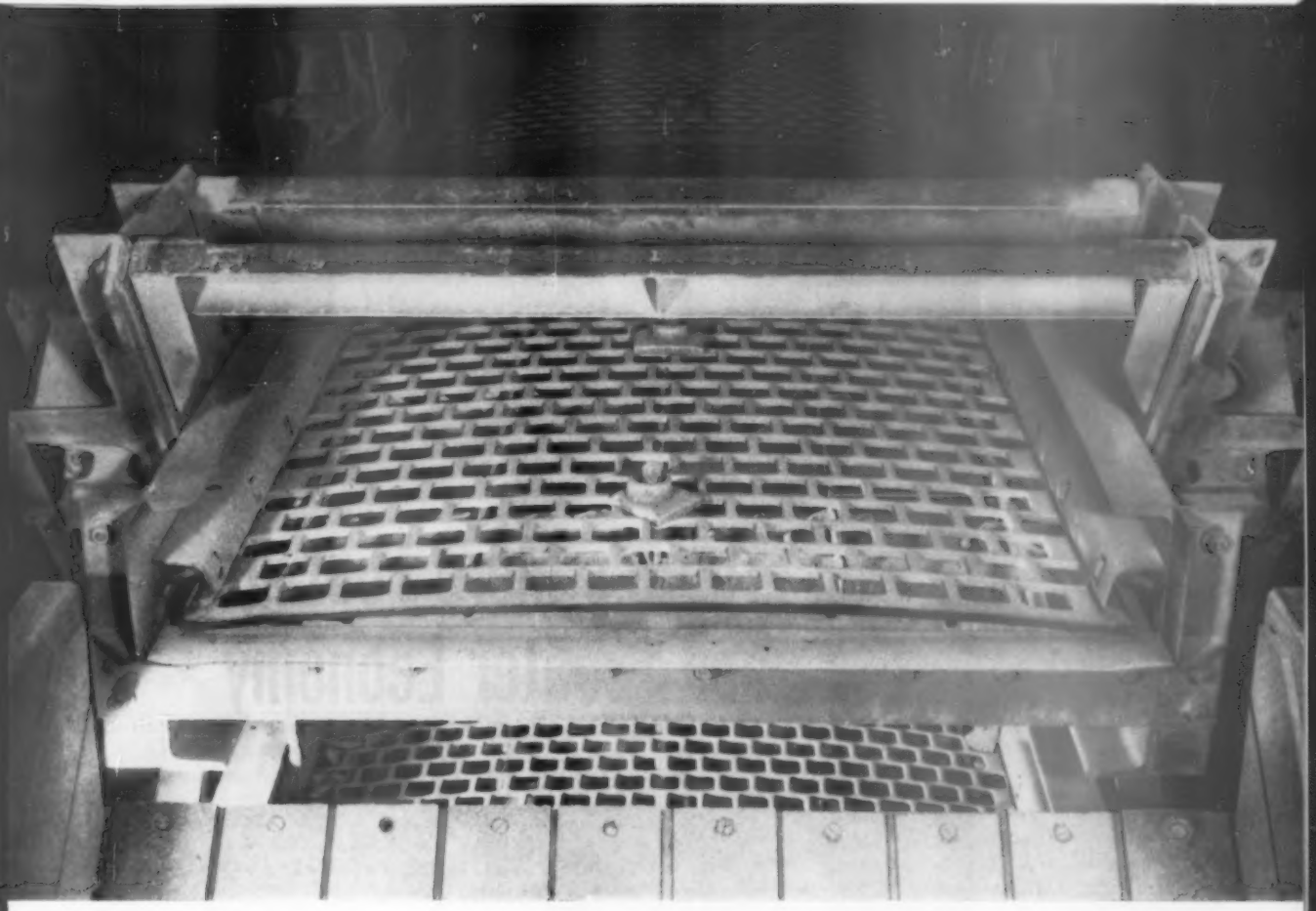
Vibrating feeders

A LINE OF VIBRATING FEEDERS made in basic sizes from 3 to 10-ft. lengths, and widths from 6 in. to 36 in. is now offered. The new feeders apparently simplify the handling of bulk materials such as sand and chemicals in limited spaces.

Mechanical simplicity, completely enclosed drives and elimination of lubrication problems with specially designed rubber bushed, spring-loaded supporting arms makes them ideal for installation in inaccessible locations. Elimination of complicated electrical systems makes possible easy maintenance by regular mechanical staff. *Ajax Flexible Coupling Co., Inc., Westfield, N.Y.* **Enter 220 on Reader Card**

(Continued on page 173)

Enter 1254 on Reader Card



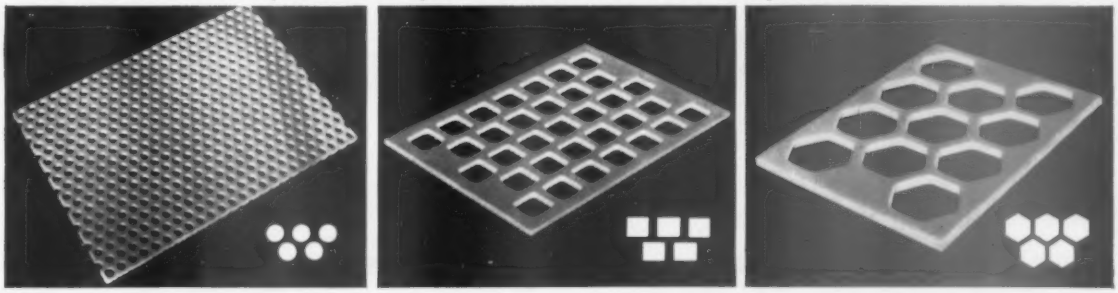
with **CROSS** perforated steel screens . . .

You can save up to 20% on replacement

For many rock products applications, CROSS Perforated Screens made from high-quality steel can save you as much as 20% on replacement costs. Tests prove that CROSS Perforated Screens have a service life nearly double that of other types of screens. And, because CROSS screen plates are manufactured as rigid, one-piece units, there is no problem of stretching or loss of screen tension. You save on down-time costs, too, because screen adjustments and reshaping are eliminated.

CROSS PERFORATED steel screens are available in a wide range of sizes with uniformly spaced square, hexagon or round perforations, staggered for increased capacity and efficiency. For additional information on CROSS Perforated Screens for sand, gravel and rock products applications, write CROSS PERFORATED METALS, National-Standard Company, Carbondale, Pa.

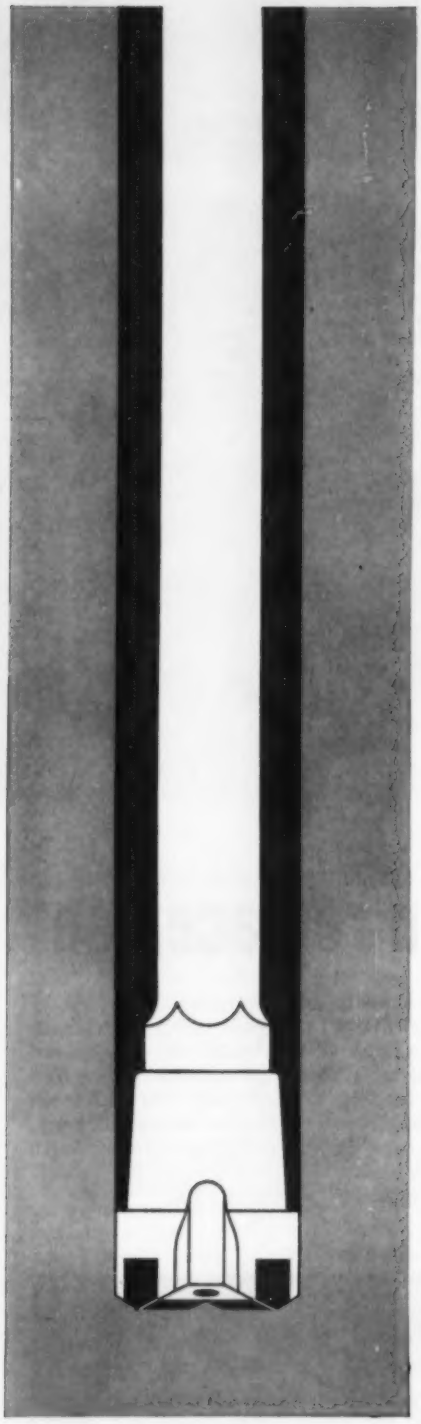
CROSS makes a complete line of perforated screens to fit every need



CROSS Perforated Metals

Carbondale, Pa.

NATIONAL NS **STANDARD**



There's More Footage and Greater Economy in a Joy TC Bit

Here's why . . . Joy bit blanks are precision machined from a fine alloy steel, and a controlled heat treating process adds strength to give rugged service and long life. The carbide insert, a special grade selected for its extra footage-producing ability, is brazed to the bit blank by an exclusive process. This provides a super tough bond between the carbide and the bit blank—there's no lost time due to lost carbides.

YOU'LL FIND YOUR BIT SIZE IN THIS CHART

SHOULDER DRIVE	BOTTOM DRIVE	TAPER SOCKET
1½"	*2½"	1¼"
1⅝"	*2¾"	1⅜"
1¾"	*3"	1½"
1⅞"	*3¼"	1⅝"
2"	*3½"	1¾"
2⅛"	*4"	
2¼"	*4½"	
2⅜"	*5"	
2½"	†4"	
2¾"	†4½"	
3"	†5½"	
*3½"	†6"	
*4"		
*4½"		

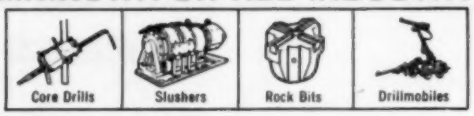
NOTE: * x-type. †Rose design Others are cross type.

These features, plus the excellent chipway design that provides maximum hole cleaning ability, keep Joy bits drilling longer. You get more hole per bit . . . more hole per shift . . . more production.

For proof of performance, contact your Joy representative. He will be glad to demonstrate Joy Tungsten Carbide Bits.

Write for Bulletin 295-27

EQUIPMENT FOR MINING . . . FOR ALL INDUSTRY



JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

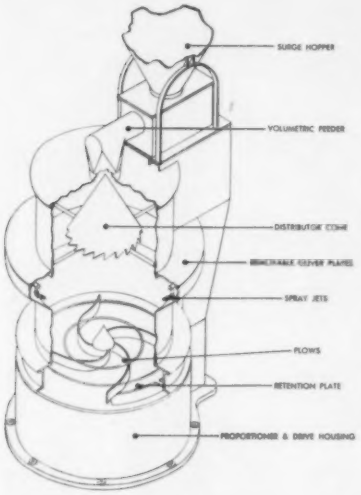
In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

WSW M-7810-285

Enter 1310 on Reader Card

NEW MACHINERY

(Continued from page 170)



Continuous blender

A CONTINUOUS-FLOW BLENDER proportions, mixes, blends and discharges a wide range of dry materials or blends liquids with solids in precise quantities. The blender, called Verticone, can be used in a wide variety of applications in the rock crushing and cement industries, such as the control of dust created by the unloading or discharging of crushed limestone or cement clinker from bins and silos. Dry materials are rendered dust-free for further handling, processing or transportation. Verticone treatment also suppresses the dust from the unloading of collection bins of cyclones, bag filters, or electrostatic precipitators on dryers, kilns, etc., for dust-free disposal by truck or rail, or return to process.

Materials to be treated or blended are fed proportionately into the Verticone via controlled volumetric feeding equipment onto the apex of a cone. This cone is the first step in blending of solids as it causes the material to form a circular, falling curtain as it leaves the base periphery of the cone.

At the base of the cone, spray headers can be provided to disperse any desired liquid into the mixture in any proportions required. Liquid is sprayed on the blended dry material from both inside and outside the curtain as it falls onto a retention plate. Further blending of both the solids and liquids is made on the retention plate by mixing blades that automatically discharge the blended and treated material. *The Johnson-March Corp., 1724 Chestnut St., Philadelphia 3, Pa.* **Enter 223 on Reader Card**

(Continued on page 176)

NEW Fairbanks-Morse Electronic Weight Detector

Auto-Manual Switch
Time Control permits varying time of control actuation.
Sensitivity Control permits adjusting to meet operating conditions.

Prevents incorrect weighing . . . stops costly errors!

With the new Electronic Weight Detector, true weight of any load can be automatically obtained and recorded without need of a weighman. Where a weighman is used, it is impossible for him to record incorrect weights or start a sequence at the wrong time. When desired, a flip of the switch can disengage the Weight Detector entirely from the system. *This is the first fully-reliable control of its kind available in the scale industry.*

To completely automate your weighing—to be sure that your weights are correct—to protect yourself by completely policing your entire weighing operation—contact your nearby Fairbanks-Morse Field Engineer, or write directly to Fairbanks, Morse & Co., 600 South Michigan Ave., Chicago 5, Illinois for complete information.

See Sweet's Plant Engineering File for full line of F-M Scales

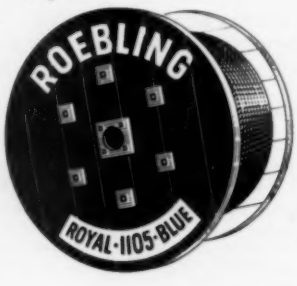
FAIRBANKS-MORSE

a name worth remembering when you want the BEST

SCALES • PUMPS • DIESEL, DUAL FUEL AND GAS ENGINES • ELECTRIC MOTORS
GENERATORS • COMPRESSORS • MAGNETOS • HOME WATER SYSTEMS

Enter 1260 on Reader Card

When you're talking about a $162,000 dipper shovel, you've got to talk about the best rope for it



Talking about or working with, the same thing applies. Anything below Royal Blue's performance level is simply unrealistic. Like looking for a cut-price brain surgeon.

Even at $162,000, the cost of wire rope is important. That's why so-so ropes can cost you more in the long run, because so-so ropes are *short run*. Royal Blue, on the other hand, is built by America's oldest manufacturer of wire rope to last, to do the job without a whimper. Here's why.

Royal Blue is made from the toughest rope wire ever made—Type 1105—extra high-strength improved plow steel. This pedigree gives to the rope qualities that you can't find in any other rope: exceptional resistance to shock, abrasion, fatigue and impact. Add to these a flexibility that age cannot wither nor hustling fade and you've got a collection of characteristics that make Royal Blue the strongest rope you've ever used.

A $162,000 Dipper Shovel deserves the best and your Roebling Distributor has it . . . Royal Blue. Any inquiries about this high-born rope will be answered immediately by Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities • Subsidiary of The Colorado Fuel and Iron Corporation

Enter 1274 on Reader Card

Cement Mill Elevators... 15 to 470 tons per hour

You get matched Jeffrey-built components throughout in Jeffrey cement mill elevators with engineering at its best for material handling systems. It's to your advantage to have one dependable source for design, manufacture and for guaranteed replacement parts.

Planning new facilities? Save both time and money by using Jeffrey's long-time application experience. Send now for Bulletin 950, or place a call for engineering assistance to The Jeffrey Manufacturing Company, 935 North Fourth Street, Columbus 16, Ohio.

A. Removable split hood for easy access to head section.

B. Traction wheel with renewable NI-HARD or hardened steel sectional rim.

C. Sealed heavy-duty antifriction bearings entirely outside of casing with dust seals around head shaft.

D. Dust-tight and weatherproof 10-gauge steel casing with reinforced corners. There's ample clearance between buckets and casing.

E. Increased capacity by closer bucket spacing. Lips and sides of buckets reinforced.

F. Equipped with heavy-duty steel knuckle chain assuring long life.

G. Large access doors for easy inspection and maintenance.

H. Internal gravity take-up assures constant and proper tensioning of chain and alignment of foot shaft.

I. NI-HARD or hardened steel sectional rim foot sprocket. Rim sections easily replaced when worn.

J. Cleanout doors at front and rear.

K. Steel bottom plate assures easy cleanout.

L. Hinged inspection doors.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...
TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

Enter 1273 on Reader Card

FOR DEPENDABILITY
PLUS ECONOMY
REPLACE WITH
INDIAN BRAND

Get the most out of your present equipment. When you need replacements, remember we started in 1913 to build our reputation in the Manganese Steel field for dependability plus economy.

Insist on
INDIAN BRAND
MANGANESE STEEL

Shovel Dippers • Dipper Teeth
Shovel Treads
Crusher Jaw Plates
Mantles • Concaves
Bowl Liners • Roll Shells
Pulverizer Hammers
Grate Bars • Breaker Plates
Ball Mill Liners • Screen Plates
Misc. Manganese Steel Castings

THE FROG, SWITCH AND
MANUFACTURING COMPANY
Carlisle, Pennsylvania • Established 1881

Enter 1306 on Reader Card

NEW MACHINERY

(Continued from page 173)

Air-powered gearshift

AN AIR-ACTUATED gear shifting control unit for the 10-speed RoadRanger transmissions has been placed on the market. Called Fullair Control, the unit consists of a small master control which replaces the conventional gear shift lever or corresponding part of a mechanically actuated remote control. Movement of the short shift lever actuates air valves, which in turn release compressed air to a slave unit on the transmission to activate power cylinders, thus shifting the gears.

Advantages include positive, effortless gear shifting through the use of air power, and the employment of flexible air lines which eliminate clearance problems encountered with mechanical linkage in tilt-cab and cab-over-engine type vehicles. *Fuller Mfg. Co., Transmission Div., Kalamazoo, Mich.*

Enter 224 on Reader Card

Bulk hauler

A NEW SELF-UNLOADING bulk transport for handling a variety of dry materials is now in production, according to the manufacturer. The new unit, designated Bulkmaster model FB-T, unloads fertilizer, lime, salt, coke, sulphur and many other dry granular commodities.

Extremely versatile, the unit pit dumps, or can be equipped with a 14-ft. folding or rigid full-swiveling 18-in. wide belt elevator. A boom and cable assembly swivels the elevator around to lie flat against the body when not in use. The system discharges in excess of one ton per minute, depending on the material.

The all-steel, electrically-welded body is ribbed for extra strength and equipped with tailored heavy-duty canvas tarpaulin and bows. Standard body lengths are from 20 to 36 ft. in a choice of single or tandem axles. *Dorsey Trailers, Elba, Ala.*

Enter 225 on Reader Card

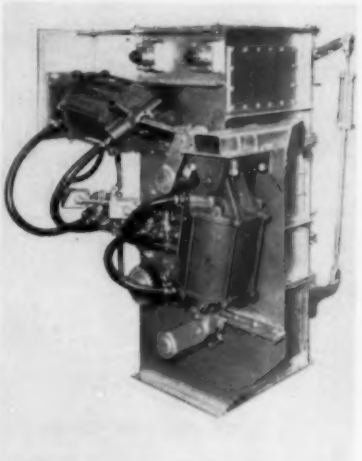
3½-ton car shaker

A NEW CAR SHAKER has been designed for medium and small operations. The addition of a 3½-ton unit to the line of car shakers permits fast, safe pushbutton unloading of granular materials from open top, hopper bottom gondolas.

The new shaker is particularly adapted for industries unloading 4 or 5 gondola cars a day of sand, gravel, slag, crushed stone and coal. It fits all standard hopper cars in North America and is powered with a 10-hp. motor. *Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.*

Enter 226 on Reader Card

Gate lock is designed for pneumatic systems



A PRESSURE GATE LOCK in a pneumatic conveyor system now being installed in an Idaho fertilizer plant will permit the pressure-type conveyor system to move phosphate rock both to and from a surge bin used in process.

First of its kind, the lock is unique in that it operates under positive pressure. It was specially engineered to handle material at 20 tph. with 15-lb. positive pressure above the gates.

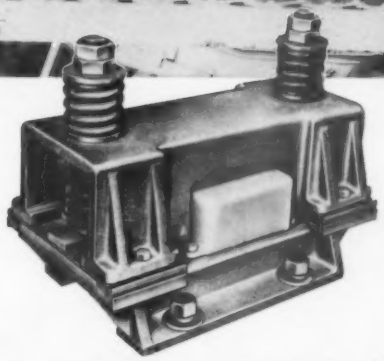
The new lock is equipped with special air cylinders which close the gates and hold against the downward pressure after a predetermined amount of material has been transferred from the conveyor system receiver. *Dracco Div., Fuller Co., 4063 E. 116th St., Cleveland 5, Ohio.*

Enter 227 on Reader Card END

SYNTRON

Pulsating Magnet

BIN VIBRATORS



vibrator on rock aggregate bins

reduce production costs—

Keep materials flowing freely

SYNTRON Electromagnetic Bin Vibrators have many applications in the sand, gravel, aggregate and heavy stone industry. They are primarily used to agitate materials in bins, hoppers and chutes to prevent arching and plugging and keep them flowing freely to process equipment.

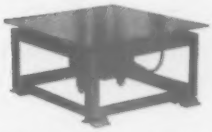
SYNTRON BIN Vibrators are electromagnetic units (3600 instantly controlled vibrations per minute) that will move the most stubborn materials—eliminate damaging and hazardous pounding and rodding. Simplicity of design assures dependability of operation and low maintenance.

SYNTRON Bin Vibrators provide the most efficient and effective method of keeping bulk material on the move. Available in sizes for every operation large or small. Easy to install, operate and maintain.

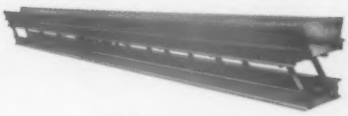
If you are troubled by production slow downs due to sticking material call SYNTRON or—

Write for detailed information on SYNTRON Bin Vibrators

Other SYNTRON Equipment of proven dependable Quality



VIBRATORY PACKERS & JOLTERS



MECHANICAL VIBRATING CONVEYORS

ROTARY VIBRATOR CAR SHAKERS

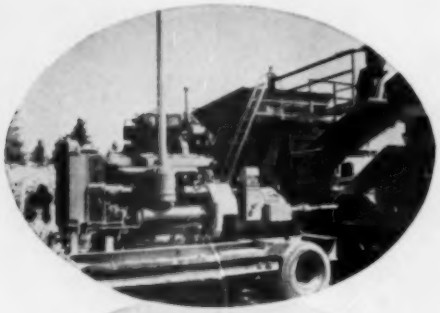
DRY FEEDER MACHINES

TEST SIEVE SHAKERS

SYNTRON COMPANY

450 Lexington Ave. Homer City, Penna.

Enter 1272 on Reader Card



Economize with

MURPHY DIESEL

Dependable Job-Site

ELECTRIC POWER

Murphy Diesel Mech-Elec Unit (upper left) supplies electric and mechanical power simultaneously or separately for a portable aggregate plant in the East.

Murphy Diesel Generator Set (left) provides inexpensive dependable electric power for a portable asphalt plant in New Hampshire.

Murphy Diesel Generator Set (below) reduces power-plant maintenance costs on an all-electric scalping plant in South Dakota. A 121 KW Murphy powers the plant.

Whatever *your* job, Murphy Diesels' economical operation and dependability for heavy-duty service keep costs low and profits high. Ask your Murphy Diesel Dealer about the advantages of Murphy Power for your plant.

MURPHY DIESEL

HEAVY-DUTY POWER
for ROCK CRUSHING

Murphy Diesel engines and power units are available in sizes from 96 to 264 H.P. with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 64 to 165 .K.W.

MURPHY DIESEL COMPANY

5315 W. Burnham St. Milwaukee, Wisconsin

SALES . . . PARTS . . . SERVICE

Throughout the Nation

404RO

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Enter 1216 on Reader Card

Four of Merritt-Chapman & Scott's seven 6-yd. Lima Type 2400 Shovels are shown working on the excavation site of the Niagara Power Project's main generating plant at Lewiston, N. Y.

Four contractors use 17 Limas on giant Niagara Power Project

Wherever there is a really tough job to be done—when high production, dependable heavy-duty service, rugged power, and low operating cost are essential—you are almost certain to find powerful Limas chosen for the task.

The $720,000,000 Niagara Power Project is a big job—one of the biggest. Four of the project's contractors are using a total of 17 high-output Limas on their jobs! The duty roster includes 11 big 2400's which can be used interchangeably as 6-yd. shovels, variable capacity draglines and cranes; one Type 802 50-ton crane; two 4-yd. Type 1601 shovels; one Type 1201 which can be used as a 3½-yd. shovel or 70-ton crane; and two 35-ton 54-T truck cranes.

Around the world, profit-minded contractors know from experience that it pays to buy Limas. They are quality-built throughout to deliver high production at low operating and maintenance costs.

Quality Lima Features

Here are a few examples of the superior features found in the Lima Type 2400—extra strong and rigid rotating base supported by oversize conical rollers in conjunction with double flanged heat-treated roller path and separate hook rollers; horizontal gear train and swing bevel gears are pump-lubricated in oil-tight case; anti-friction bearings are used throughout. Induction hardening of all wearing parts increases life. Crawler bushings are equipped with piston-ring type oil seals. Torque converter adjusts load speed to correspond with the resistance to moving the load—no engine stall.

Limas For Every Job

Profit with Limas—there is a type and size for every job—½ to 6-cu. yd. shovels, cranes to 110 tons crawler-mounted, 70 tons on rubber, variable capacity draglines. Investigate now! Contact your nearby Lima distributor or write us for full details.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA Construction Equipment Division, Lima, Ohio

BALDWIN · LIMA · HAMILTON

5935

Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment

BALDWIN BLH LIMA-HAMILTON

MANUFACTURERS NEWS

Le Roi names Koehler general sales manager

RICHARD H. KOEHLER has been appointed general sales manager of the Le Roi Division of Westinghouse Air Brake Co., Milwaukee 1, Wis. Mr. Koehler succeeds Jack E. Heuser who has resigned to become an associate with the management consulting firm of Worden and Risberg of Philadelphia. Mr. Koehler moves into this assignment from the staff of the president of Westinghouse Air Brake Co., Pittsburgh, where he has been director of advertising and publicity.

Goodrich offers $50,000 gifts

THE B. F. GOODRICH CO., Akron, Ohio, has announced that gifts totaling $50,000 will be distributed to five leading privately financed universities. Gifts of $10,000 each have been made to Harvard, Yale, Princeton, Cornell and the University of Chicago.

"These universities were selected because they are among the most productive privately financed institutions in training talented graduate students for university teaching, careers, and for research and the professions," said J. W. Keener, president.

The gifts were a part of the Goodrich program of aid to higher education which includes student scholarships, employe tuition and other activities.

Eager named Joy officer

ROBERT W. EAGER has been named manufacturing vice president of Joy Manufacturing Co., Pittsburgh, maker of mining equipment and other heavy machinery.

Cessna's 1,000th model 310 delivered to Illinois firm

CESSNA AIRCRAFT CO., Wichita, Kansas, has delivered its 1,000th Model 310 to the Stephens-Adamson Mfg. Co., Aurora, Ill.

When "N 1736 Hotel" came off the production line, it carried two special distinctions. In addition to being 310 number 1,000 off the line since the airplane went into production in late 1954, it was also the first new 1959 Model 310C scheduled for retail delivery.

The airplane will be used at Stephens-Adamson to transport top and middle management personnel and field service superintendents.

Morris appoints Doty to Cleveland office

MORRIS MACHINE WORKS, Baldwinsville, N.Y., has appointed Howard R. Doty as company sales representative for the Cleveland office. Previously Mr. Morris was with the industrial engineering department of Aluminum Co. of America.

Drill bit firm changes name

NEW NAME for Brunner & Lay Rock Bit of Philadelphia, Inc., is Brunner & Lay—Eastern, Inc. The firm's Philadelphia address and telephone number remain the same.

Howard appointed Diesel Division Manager

FAIRBANKS, MORSE & CO., Chicago, Ill., has announced the appointment of Sheldon K. Howard as diesel division manager, succeeding Carroll E. Dietle who has resigned after 27 years of service.

Mr. Howard comes to Chicago from Atlanta where he has been manager of the diesel department for the past eight years. *(Continued on page 182)*

Enter 1294 on Reader Card

another Olin Mathieson packaging product!

STEPPED-END BAGS

A self-sealing multiwall that stops 'slow leaks'!

Here's a revolutionary new multiwall for shipping powdered, pelletized, and granular materials! A new stepped-end valve and closure design perfected by Olin Mathieson kraft packaging engineers eliminates 'blow-backs' and messy spills during filling, reduces escape of 'fines', speeds your packaging operation, and protects against seepage during shipment! Investigate this new stepped-end feature today... also available in the new Olin Mathieson Skid-Master nonskid bag! Packaging Division, P. O. Box 488, West Monroe, Louisiana.

OLIN MATHIESON • PACKAGING DIVISION

(Continued from page 180)

Rock wagons average 33 trips a day at dam

"MORE HAUL PER SHIFT" is the keynote of operation at the Thomaston flood control dam in Connecticut where Oneglia & Gervasini, contractors, depend on three Athey PR21 rear dump trailer units to make 33 round trip, 800-ft. hauls per day loaded with 18 to 22 cu. yds. of rock, gravel and clay. The Athey equipment teamed with Caterpillar's tractor can spin around in a 33½-ft. circle, body down, which means no maneuvering to back into position.

Cummins promotions

CUMMINS ENGINE CO., Inc., Columbus, Ind., has announced the promotion of G. L. Bego as director of sales and services, and R. W. Franck, field sales manager.

Mr. Bego is responsible for directing all activities of the sales development department, and Mr. Franck for fleet sales activities and Cummins' regional offices.

Educational motion picture

A NEW, EDUCATIONAL motion picture which describes the applications of basic refractory products particularly in steel, cement, glass and copper industries has been released by the Kaiser Chemicals Division, Kaiser Aluminum & Chemical Corp., Oakland, Calif.

The 16 mm. sound and color film runs 29 minutes in length. It covers the improvements that have been made in basic refractories over the past several years as a result of research and product development work.

R. G. Allen named Midwest sales manager

RICHARD G. ALLEN has been appointed Midwest sales manager of construction chemicals by the Dewey and Almy Chemical Div., W. R. Grace & Co., Cambridge, Mass.

Mr. Allen will fill a newly created position, acting as liaison between the firm and its Midwest distributors of concrete air entraining agents, and other admixtures for the construction industry.

International dump trucks with 10-yd. capacity

THE NORTH WILBRAHAM Sand and Gravel Co., North Wilbraham, Mass., has palced in operation five International Harvester Co., Chicago, Ill., Model RDF-230-H trucks with 10-yard-capacity dump bodies. The trucks were purchased to service a new crushing plant which it expects will help increase business measurably. Equipped with Cummins NH-180 diesel engines and four-speed auxiliary transmissions, the RDF-230-H trucks are used to haul aggregate between a quarry and the new crushing plant.

World's largest power shovel

THE WORLD'S LARGEST power shovel is now under construction by a division of Universal Marion Corporation. The giant machine, a type 5761 stripping shovel which is being built by the Marion Power Shovel division, Marion, Ohio, will have a 65-cu. yd. dipper on a 165-ft. boom and will have a working weight of more than 6,500,000 lb.

Aggregate Engineers, Inc.

GORDON I. GOULD, internationally known in the mining industry, has announced the formation of Aggregate Engineers, Inc. The new company will function as engineers, designers, fabricators and sales representatives to the rock industry. E. J. Marriott, formerly vice president of Standard Machinery Co., is vice president and manager of the new company. Sales and engineering offices are at 58 Sutter St., San Francisco 4, Calif.

Allis-Chalmers and union reopen talks

ALLIS-CHALMERS MFG. CO., last major farm and construction-equipment maker to hold out for local bargaining with the United Auto Workers union, resumed talks with union representatives in March. A strike of more than 15,000 UAW members had been going on for more than a month at the time.

Despins named manager A-C Mexico district

ALLIS-CHALMERS MFG. CO., Milwaukee, Wis., has announced the appointment of J. E. Despins as manager, Mexico district, succeeding R. B. Rodriguez who has retired after representing the company in Mexico since 1938.

Mr. Despins joined Allis-Chalmers in 1936 and four years later was assigned to the El Paso, Texas, office as sales representative. In 1949 he was promoted to manager of the office.

Randolph named Calco sales engineer

CALCO SUPPLY CO., San Francisco, has announced the appointment of George B. Randolph as sales engineer. Mr. Randolph formerly was on the sales staff of The Republic Supply Co., San Leandro.

Calco is a wholly-owned subsidiary of Calaveras Cement Co.

Browne appointed sales manager

HARNISCHFEGER CORP., Milwaukee, Wis., has announced the appointment of Hardwick L. Browne as sales manager, welding products, international division. Mr. Browne will operate out of the P&H International division offices in Milwaukee and will handle the sales of welding machines, electrodes and positioners. *(Continued on page 186)*

Enter 1253 on Reader Card

NOT HERE! Bucyrus-Erie balanced engineering keeps production humming

A quiet job is a job in trouble.

The roar of trucks on the move . . . the smack of a shovel biting off a load . . . *these* are the money-making sounds of production. And to lick the problem of excessive downtime, *many quarry operators choose Bucyrus-Erie electric shovels.*

Behind this popularity is Bucyrus-Erie's consistently high performance . . . backed by *Balanced Engineering.* Heavy-duty construction throughout keeps the shovel working, holds down maintenance, assures long service life. Power is delivered smoothly, accurately and dependably . . . doesn't go "down" at frequent intervals for tricky adjustments or servicing.

Your Bucyrus-Erie man can give you the full story on Balanced Engineering on the 4½-yd 110-B, 6-yd 150-B and 8-yd 190-B. Call him soon, or write Bucyrus-Erie Company, South Milwaukee, Wis., Dept. 1LB.

BUCYRUS ERIE

Builds Better Equipment

ECONOMIZE

with built-in REOPCO*

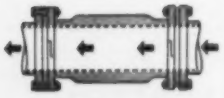
Massco-Grigsby Pinch Valves

...their Long Wearing Life makes them

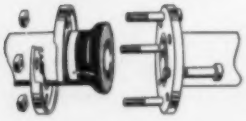
Cost Less to Own!

- **Rubber or Neoprene sleeves for abrasive and corrosive pulps and liquids**
- **1" to 14" inside diameter**
- **Pressures to 150 psi.**
- **Temperatures to 200° F.**
- **Manual or power-operated closing mechanisms**
- **Automatic regulation and remote control available.**

Patented "hinged" sleeve. Recesses serve as "hinges" during compression; reduce strain and permit tight closing.



Unobstructed flow eliminates high friction loss.



Split flanges and Flex Seal ends assure perfect seal.

*Reduced operating costs.

and Laboratory Equipment, too

4" x 6" Massco Laboratory Jaw Crusher

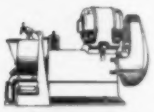
Welded steel frame; manganese steel jaw and cheek plates; bronze bushed bearings; smooth jaws give better product and easier cleaning. Adjust for plate wear and product size by convenient hand wheel adjustment.

6" and 10" Massco Gy-Roll Reduction Laboratory Crusher

Reduces ½" feed to as fine as 10 mesh in single pass. High capacity, low power consumption.

Laboratory Crushing Rolls

Sizes (Diameter x width): 8" x 4", 10" x 6", 10" x 8", 12" x 10" and 12" x 12". Adjustable roll space setting up to ¾". Double V-belt drive. Heavy, cast Meehanite frame absorbs vibration, results in long life.



Massco-McCool Pulverizers

Disc type grinder with a planetary movement. No gears. Will grind to 150 mesh in one pass.

WRITE FOR CATALOGS

Manufacturing Division

MINE AND SMELTER SUPPLY CO.

DENVER 16	NEW YORK 17	SALT LAKE CITY 1	EL PASO
3800 RACE STREET	122 E. 42nd STREET	121 W. 2nd S.	1515 11th AVE.

LICENSED MANUFACTURERS AND SALES AGENTS in Canada, Australia, Sweden, England, South Africa

SALES AGENTS in Peru, Chile, Philippine Islands, Japan, New York City (for Continental Europe) and in principal cities of the U.S.

Enter 1270 on Reader Card

Loads 26 tons in 3¼ minutes

Aggregate producers are quick to recognize a material handling system that is both fast and economical.

At the Niagara Stone Division plant of Olsker McLain Industries, Inc., in Niagara Falls, New York, the entire stockpile operation is handled by a pair of "PAYLOADER" tractor-shovels, each with 9,000 lb. carry capacity. They handle about 50% of the ½ million tons of commercial crushed stone produced annually and the management is well pleased with their production records as well as their low upkeep.

During periods of peak production, the "PAYLOADER" units easily meet extra demands. Frequently one unit loads out in excess of 1,200 tons of crusher run stockpile material during 4½ hours of continuous operation — an average of 266 tons per hour. On several occasions the "PAYLOADER" has truck-loaded 26 tons of material in 3¼ minutes time.

The key to these profit-making production figures lies in the exclusive "balanced-design" of "PAYLOADER" tractor-shovels that provides maximum stability for all-around usefulness and material handling efficiency. These rugged loaders possess a tremendous breakout force and bucket tipback at ground level that enables them to get maximum loads and keep them during travel.

Four-wheel-drive, power-transfer differentials, and large pneumatic tires give them positive traction and flotation on any kind of footing. All have power-shift transmission, power brakes and power steering for easy handling.

There is a "PAYLOADER" size to fit the requirements in your plant too — up to 12,000 lb. carry capacity. Contact your Hough Distributor and let him match the efficiency of a "PAYLOADER" to your job.

NEW LITERATURE

. . . is available without obligation showing the complete "PAYLOADER" tractor-shovel line and the useful attachments available for each model.

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
705 Sunnyside Avenue
Libertyville, Illinois

☐ Send "PAYLOADER" line literature

Name

Title

Company

Street

City State

6-8-4

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THERE IS THE RIGHT BIT FOR YOU OUT OF THE MANY POSSIBLE COMBINATIONS OF SIZES AND TYPES

Write today . . . giving all information you can provide. Out of the many combinations possible with four matrices, several stone size ranges, three grades of diamonds, and various face contours we will recommend the bit we believe to be the best suited for your drilling conditions.

Always specify Sprague & Henwood "Oriented" Diamond Bits. They are described and illustrated in Bulletin 320-1.

SPRAGUE & HENWOOD, Inc.
SCRANTON 2, PA.
MEMBER OF DIAMOND CORE DRILL MANUFACTURERS ASSOC.
New York — Philadelphia — Atlanta — Pittsburgh — Grand Junction, Colo. — Buchans, N.F.

EXPORT SALES: SPRAGUE & HENWOOD INTERNATIONAL CORPORATION, 11 W. 42nd St., N.Y., N.Y.

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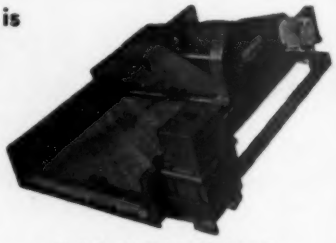
Difficult Fine Mesh Screening is Easy for the Leahy® Screen

For screening difficult or damp materials, such as lime, ag-lime or silica sand, there is none to match the Leahy No-Blind® screen with fully integrated FlexElex® heating. It's unexcelled efficiency stems from the fact that all screening factors, even the heating, are completely integrated. Such inclusive outstanding design offers specialized equipment for your special screening job. Send for Bulletin 16-EH.



Made by the Original Deister Co. *Incorporated 1906*

The DEISTER CONCENTRATOR COMPANY, INC.
915 Glasgow Avenue — Fort Wayne, Indiana

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GILSON
TESTING SCREEN

A proven profit maker. Controls and guarantees your product. Fast, accurate, trouble-free.

For sizing test samples of crushed stone, sand and gravel, slag and similar materials in a size range from 4-in. to 200-mesh.

GILSON TESTING SCREEN
with motor, dustpan tray and 5 coarse series screen trays..$500 FOB Malinta, Ohio
Shipping Weight.....500 lbs.

Write for complete GILSON catalog

SAMPLE SPLITTER

Reduces large samples for convenient testing. Adjusts for all materials, sand to heavy aggregate. Simple to use. Heavy welded steel construction.

SAMPLE SPLITTER
complete with two material pans and bag-loading chute..$125 FOB Malinta, Ohio
Shipping Weight, crated.....195 lbs.

GILSON SCREEN CO.
MALINTA, OHIO

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MANUFACTURERS NEWS

(Continued from page 182)

Warren is Sutorbilt general sales manager

HENRY S. WARREN has been named general sales manager of the Sutorbilt Corp., Maywood, Calif., subsidiary of the Fuller Co. The maker of fans and pneumatic conveyors said the move was made to strengthen the firm's sales activities.

Mr. Warren had been sales promotion manager of the Stoody Co., maker of hardfacing materials. A former instructor in marketing at Los Angeles State College, Mr. Warren is the author of papers on sales training and welding practices.

Torit manufacturing names new regional sales manager

RICHARD BENNETT has been named regional sales manager for the Chicago area for Torit Manufacturing Co., St. Paul, Minn. Mr. Bennett will supervise sales activities for industrial dust collectors, associated equipment.

Galion firm appoints new executive

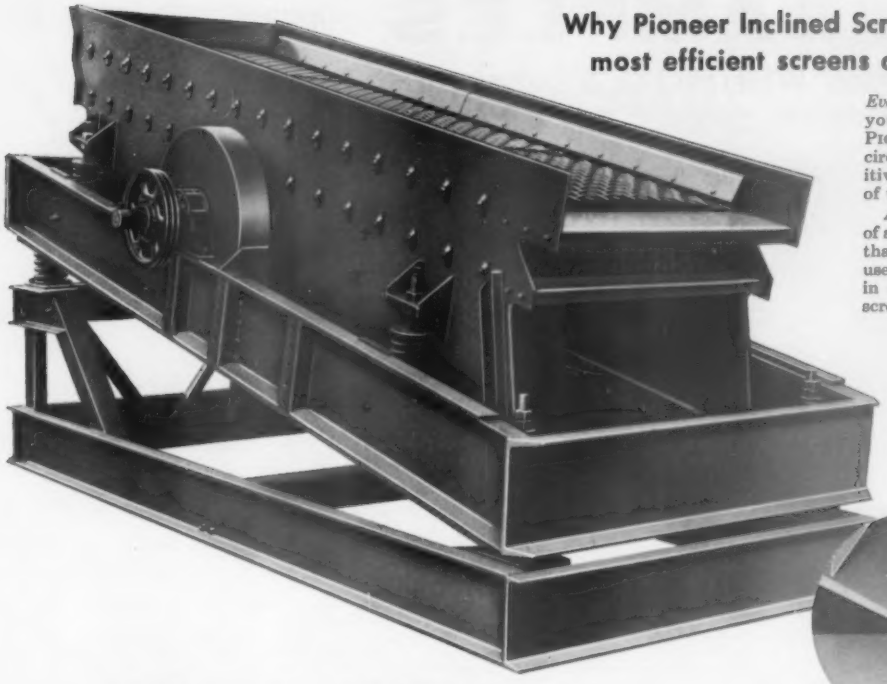
FRANK C. MCMANUS, formerly president of the Anthony Co., has joined the Eagle Crusher Co., of Galion, Ohio, as executive vice president and general manager. Mr. McManus will also be a member of the executive staff of the Perfection Steel Body Co., Galion, to assist in the future planning, research, and merchandising of Perfection truck and trailer dump bodies, hydraulic hoists and other product developments.

(Continued on page 188)

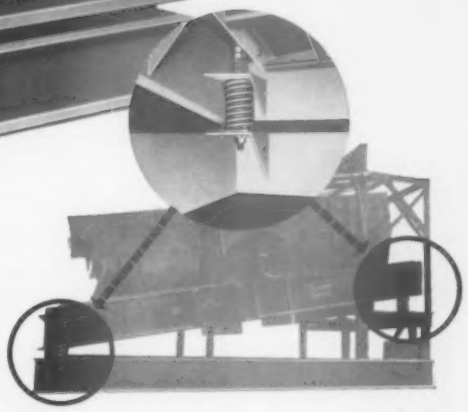
Why Pioneer Inclined Screens are among the most efficient screens on the market today

Every inch of this Screen works for you. No matter what the load, PIONEER's perfectly balanced full-circle throw provides the same positive *downhill* agitation at each end of the screen as in the middle.

Also . . . the easy downhill slope of a PIONEER Inclined Screen means that all the energy is effectively used for screening . . . not used up in conveying material across the screen cloth.



Note how Pioneer secondary spring suspension actually floats screen frame to keep vibration in the screen and protect supporting structure.



What's different about these new-type Vibrating Screens?

Answer: *Virtually no vibration transmitted to the supporting structure.*

PIONEER's new and exclusive system of dual spring suspension keeps vibration in the pan . . . *where it belongs! The supporting structure doesn't have to fight back.*

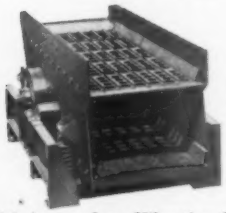
This is important, for no matter how perfectly any screen may be balanced when it leaves the factory, many things can happen later to destroy that balance. Uneven loads, clogged screens, worn bumpers, or a less-than perfect installation will disturb the balance and, in the case of conventionally mounted screens, this will set up undesirable vibrations in the supporting structure.

PIONEER engineers solved this problem by floating the screen frame on heavy coiled springs as shown in illustration at the right, above. Whether installed on bin, floor, sill or suspension mounting, these springs have 3 big advantages:

1. Springs absorb any induced vibration and prevent its transfer.
2. Motion of screen pan is improved to give even better screening efficiency. Heavier loads and higher capacities are more easily handled.
3. Strain on screen assemblies and frame is reduced, therefore less maintenance is required. Screen cloth and punched plates last longer.

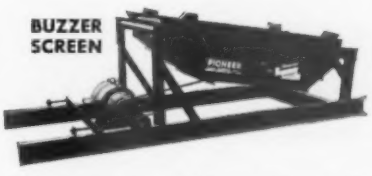
For more information on PIONEER Vibrating Screens, see your nearest PIONEER Distributor.

Other Inclined Vibrating Screens by Pioneer



MESABI SCREEN

This heavy-duty Vibrating Screen is built with brute strength to take harsh abuse. Frame is 18" car channel on I-beams reinforced with 8"-wide flange beams. Pans are ¾" or ½" thick. Four-bearing, heavy-duty shaft and other parts are correspondingly strong. Sizes from 4' x 10' to 6' x 14'.



BUZZER SCREEN

This small, compact Vibrating Screen fits on PIONEER Portable Conveyor. (With Mechanical Feeder at other end, this makes an efficient low-cost gravel plant.) Also available with bin mounting. 3' x 6' size produces up to 50 tph of ¾" material; 4' x 8' produces up to 90 tph of ¾" material.

Free Handbook

For your free copy of *Facts And Figures* (the most complete and comprehensive handbook for the aggregates-producing industry), write to PIONEER ENGINEERING, Minneapolis 14, Minnesota, or contact your Pioneer Distributor.

Pioneer®
ENGINEERING
DIVISION OF POOR & COMPANY, INC.

Enter 1268 on Reader Card

TRIAL SAMPLES

Of World-Famous WHITMORE'S Lubricants NOW IN AEROSOL SPRAY-ON CANS!

HANDI-LUBE LIQUID GEAR COMPOSITION

For open gears, sliding surfaces—exclusive formulas eliminate metal to metal contact, keep wear on the lubricant not the metal—no breakdown even after prolonged use under water—available for every climatic condition—packaged in handy 16-oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

WIRE ROPE SPRAY LUBRICANT

Exclusive formulas for lubricating and protecting wire rope, chain, springs. Penetrates to the core of wire rope minimizing internal friction and increasing usable life up to 300%—special protective qualities absolutely eliminate corrosion—non-gumming qualities reduce "carry-back"—packaged in handy 16 oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

65 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

- Open Gears, Dipper Sticks, Cams
- Enclosed Gear Cases
- Wire Rope and Cable
- Hydraulic Units, Torque Converters
- Roller, Ball, and Sleeve Bearings
- Speed Reducers

Est. 1893

THE WHITMORE MANUFACTURING CO.

LUBRICATING ENGINEERS

CLEVELAND 4, OHIO, U.S.A. PHONE: VULCAN 3-7272

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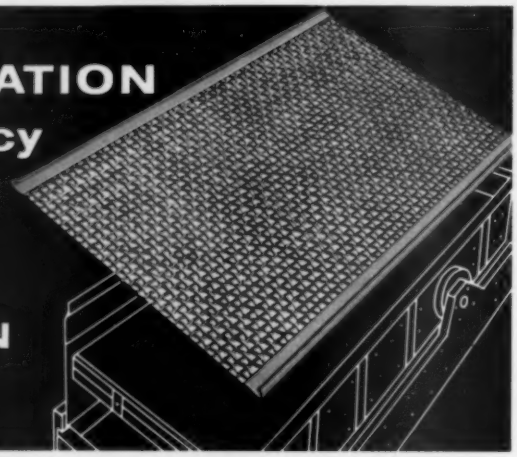
SEPARATION Accuracy Depends on the SCREEN



● Accurate separation of any vibrating equipment depends upon the screen. High tonnage, reduced blindness and extra strength are a result of careful screen selection. Cleveland's years of manufacturing experience provide a wide range of accurately sized weaves for long, trouble-free life. Available in Cleloy and all commercial metals for all types of mechanical and electrical vibrating equipment. Exclusive hooked edge design reduces bending, slipping and screen distortion.

See our ad in PIT & QUARRY Yearbook

Send specifications today. Ask for a free copy of our vibrating screen bulletin.

THE CLEVELAND WIRE CLOTH & MFG. CO.

3575 East 78th Street • Cleveland 5, Ohio • Telephone: Diamond 1-1832

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MANUFACTURERS NEWS

(Continued from page 186)

Farley named district manager

JOHN F. FARLEY has been appointed New York district manager for the Hudson Pulp & Paper Corp., Multiwall Bag Deparment. Prior to this assignment Mr. Farley had been employed by Hudson as a specialist in the development and introduction of new bag types and construction.

Kaiser Chemicals, Mexico Refractories may merge

KAISER ALUMINUM AND CHEMICAL CORP., Oakland, Calif., and Mexico Refractories Co., Mexico, Mo., announced recently that they were discussing a merger. Kaiser is a major supplier of basic (magnesia) refractories used in the cement, lime and other industries. Mexico Refractories makes clay, silica and alumina refractories. The product lines of the two firms would supplement one another.

Brown appointed sales manager

THE FRANK G. HOUGH CO., Libertyville, Ill., has announced the appointment of Herman R. Brown as sales manager, Payloader division. Mr. Brown has been associated with the company for 14 years and was formerly western regional manager. Other appointments include: K. B. Larakin, eastern regional manager; R. L. Knox, central regional manager; D. O. Ross, western regional manager; B. C. Dennett, assistant to the regional managers; C. J. Bernard, direction of manufacturers export sales as well as scheduling operations.

(Continued on page 192)

Enter 1267 on Reader Card

It's a fact . . .

"EUC" REAR-DUMPS HAUL AT LOWEST COST!

Here's Why . . .

For 25 years Euclid Rear-Dumps have been the outstanding choice of contractors, mines and quarries. They outnumber competitive off-highway haulers by close to a 4 to 1 margin. This unequalled field experience, backed by continuous product improvement, results in operating and maintenance advantages that enable "Eucs" to haul at lowest cost. These bonus benefits are not always apparent — seldom are, in fact — when you simply compare specifications, but they're mighty important to owners.

Tops in Availability

Downtime records invariably show that "Eucs" have unusually high availability and require a minimum amount of service and repair. This ability to stay on the job cuts costs, too, in standby equipment and in maintenance personnel and facilities.

Parts and Service Unequalled

With a large machine population, dealers can logically provide complete parts stocks and service but with a small number of machines in an area, extensive parts and service facilities are not economical. Generally, parts and service are available to owners of equipment in close relation to the number of machines in the territory. On this score—which has a direct bearing on the production and hauling costs of equipment—the Euclid dealer is your best source for Rear-Dump haulers, because his larger machine population justifies complete service and parts stocks to keep the equipment producing at lowest cost.

You can depend on "Eucs" and your Euclid dealer for everything that contributes to lowest cost hauling. That's why ***Euclids are your best investment.***

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

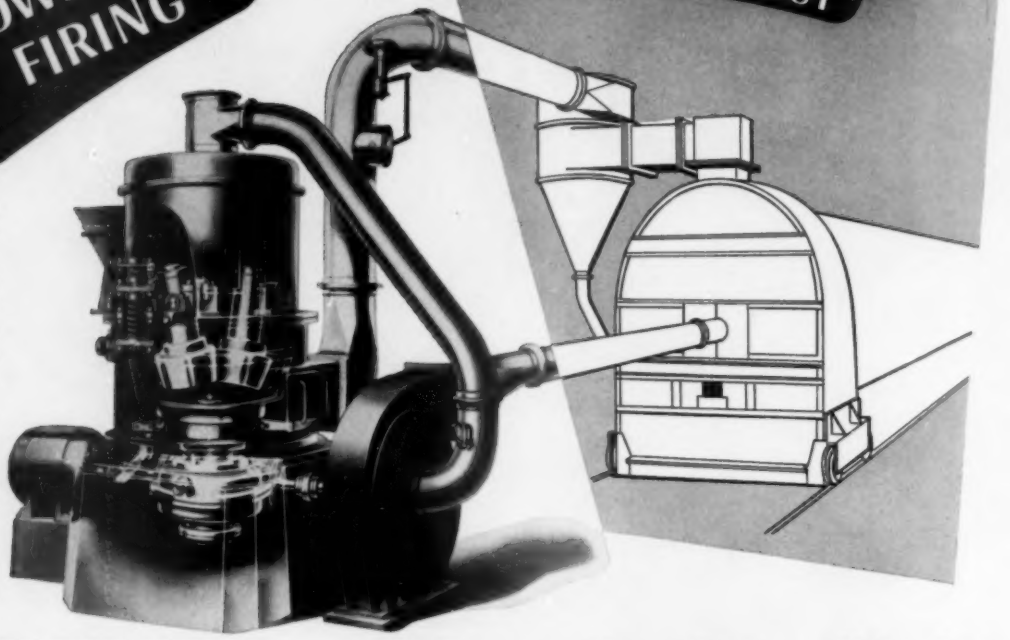
GM GENERAL MOTORS EUCLID

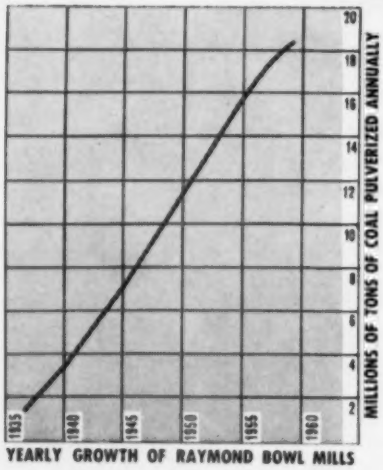
EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

Raymond
BOWL MILL
FIRING

TOP LEVEL
KILN
EFFICIENCY





YEARLY GROWTH OF RAYMOND BOWL MILLS

Over 380 Bowl Mills in 24 years, with a rated total capacity in excess of 18½ million tons of pulverized coal annually . . . an impressive endorsement by industry.

Modernize Your Rotary Kiln Firing

with the Raymond Bowl Mill . . . a complete fully coordinated coal pulverizing system with flexible control and automatic operation.

This Raymond-designed direct-firing unit provides utmost economy in grinding the coal to constant fineness, and delivering the proper coal-air mixture for insuring maximum kiln performance.

Year after year, more and more operators of lime and cement kilns are equipping their new plants with Bowl Mills . . . or converting their old plants to modern Bowl Mill installations.

The results are increased savings and operating advantages, due to these Bowl Mill features:—

(a) Handles coal of any grade or moisture content
(b) Easily adjusted or lubricated while running
(c) Sturdily built for continuous 24-hour operation
(d) High availability and wide range capacity

For a better product, lower costs and dependable performance . . . choose a Raymond Bowl Mill on its 24-year record.

Write for Raymond Bowl Mill Catalog No. 75

COMBUSTION ENGINEERING, INC.
Raymond Division

1108 W. BLACKHAWK ST.
CHICAGO 22, ILLINOIS

SALES OFFICES IN
PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada

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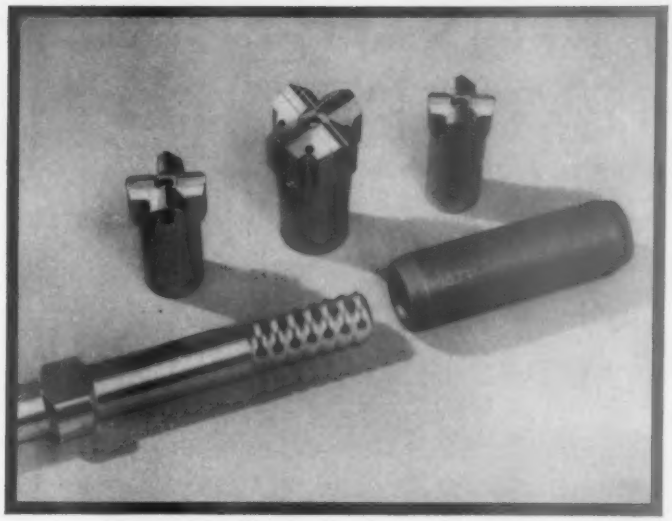

Here's proof Coromant rope-thread bits and steels SAVE TIME AND MONEY

"Up to double the footage between sharpenings!"
"Premature rod breakage is almost non-existent!"
"40% more usable life—more resharpenings!"
"Bit and rod life are well above average!"
"Uncouple by hand all the time!"
*"More rigid—drills straighter holes!"**

**Names of men quoted available on request*

The comments above are actual quotes from project managers, job superintendents, and drill superintendents who have tested new Coromant rope-thread bits and steels. They've learned, on-the-job, the benefits they—and you—can expect!

For example: The new rope-thread (only two turns per inch) holds tight in use, yet permits hand uncoupling. Reports show that the time saved results in more footage drilled per shift. Bit footage is well above average too, with less loss of carbide inserts. Prime quality ore plus nickel-chrome alloy permits cold-rolling from billets for greater strength, life and rigidity. And only with Coromant rope-thread steels can you re-thread without heat treating, too. Do it yourself, or at any nearby machine shop.

Want to know more? There's no obligation on your part, but we'll be glad to help where we can. Just call your nearest Atlas Copco Office, or write to us at Dept. RP-7.

Atlas Copco

610 Industrial Avenue
Paramus, New Jersey
COlfax 1-6800

930 Brittan Avenue
San Carlos, California
LYtell 1-0375

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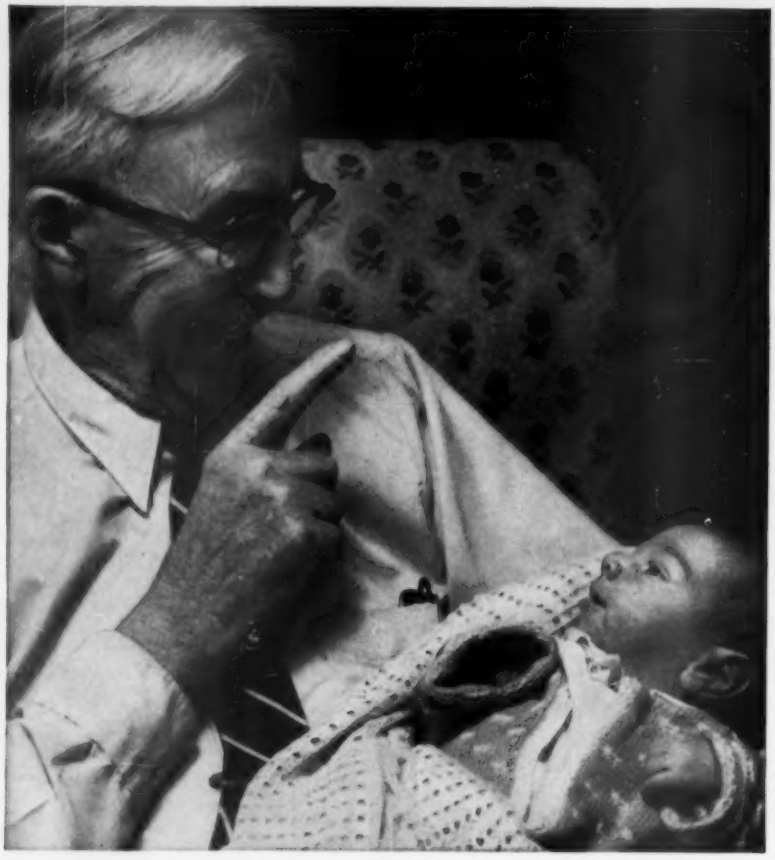
HELP US KEEP THE THINGS WORTH KEEPING



Each of us wants peace for his own precious reasons. But peace costs money. Money for strength to keep the peace. Money for science and education to make peace lasting. And money saved by individuals to keep our economy strong. Each Bond you buy helps provide this money—helps strengthen America's Peace Power. Are you buying *enough?*

HELP STRENGTHEN AMERICA'S PEACE POWER

BUY U.S. SAVINGS BONDS

The U.S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, The Advertising Council and this magazine.

MANUFACTURERS NEWS

(Continued from page 188)

GE combining Communication Products Department

GENERAL ELECTRIC CO., Lynchburg, Va., is combining its Communication Products Department, which makes two-way communication systems for construction contractors, etc., with the Technical Products Dept. of Syracuse, N.Y., which engineers advanced military communication equipment.

Harrison Van Aken, general manager of GE Communication Product Dept., will head the combined organization, headquarters at Lynchburg.

Symons enlarges staff of New York office

SYMONS CLAMP & MFG. CO., Chicago, Ill., has announced the enlargement of the staff of its Jersey City office and warehouse to better serve the New York metropolitan area.

Frank Fearon, New York sales representative, will continue in that capacity. James J. Cotter, who has more than 10 years' experience in the concrete forming equipment business, has joined the Jersey City office.

Stanton district representative

C. F. STANTON has been named district representative for Highway Equipment Co., Cedar Rapids, Iowa. Before joining Highway Equipment Co., Mr. Stanton was a district representative for Tarrant Mfg. Co., N.Y.

Highway Equipment Co. manufactures "New Leader" lime and fertilizer spreaders and blenders and "Hi-Way" ice control equipment. END

T.C. WRITE FOR CATALOG 56

DURABLE ECONOMICAL WOVENWIRE SCREENS KNOWN AROUND THE WORLD

TWIN CITY IRON & WIRE CO.
35 W. WATER STREET · ST. PAUL 7, MINNESOTA

Enter 1307 on Reader Card

ROCK PRODUCTS
THE
RECOGNIZED AUTHORITY
OF THE
NON-METALLIC
MINERALS INDUSTRY

Winslow **TRUCK SCALES**
PIT AND PITLESS TYPES

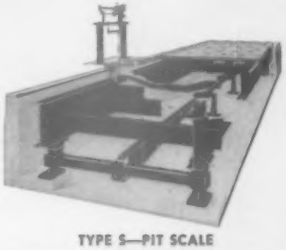
CABINET DIAL

Weight indication available includes ball bearing poise weigh-beams, direct reading and weight imprinting types, and dial equipment with or without weight printer.

Write or phone for more information
PHONE NORTH 1221

TYPE CS—PORTABLE—PITLESS

Type CS scales, pitless installation, roller bearings, heavy duty, low maintenance. Capacities 15 tons thru 50 tons. Platform sizes 18' x 9' thru 40' x 10', wood or steel deck.



TYPE S—PIT SCALE

Type S scales, pit installation, roller bearings, heavy duty, low maintenance. Capacities 15 tons thru 60 tons. Platform Sizes 22' x 9' thru 60' x 10' for wood or concrete decks.

WINSLOW GOVERNMENT STANDARD SCALE WORKS, INC.
4810 NORTH 25TH ST. TERRE HAUTE, IND.
SCALE MANUFACTURERS FOR OVER A HALF-CENTURY

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RP PRODUCER PURCHASING SERVICE

BUYER RESEARCH SERVICE *FREE*

QUICK—COMPLETE SOURCE CONTACTS FOR ROCK PRODUCTS PRODUCERS on Machinery—Equipment—Supplies—Service

___Aftercoolers, Air
___Agitators
___Aggregates (special)
___Air Compressors
___Asphalt Mixing Plants
___Bagging Machines
___Bags
___Barges
___Belting, Conveyor Elevator, Power Transmission
___Belting, V-type
___Belt Repair Equipment
___Bin Level Indicators
___Bins and Batching Equipment
___Bits
___Blasting Supplies
___Bodies, Trailer
___Buckets
___Bulldozers
___Cars, Industrial
___Classifiers
___Clutches
___Coal Pulverizing Equipment
___Concentrating Tables
___Conveyors
___Crushers
___Coolers
___Cranes
___Derricks
___Dewatering Equipment, Sand
___Diesel Engines
___Dragline Cableway Excavators
___Draglines
___Dredge Pumps
___Drilling Accessories
___Drills
___Dryers
___Dump Bodies
___Dust Collecting Equipment & Supplies
___Electric Motors
___Engineering Service Consulting and Designing
___Explosives & Dynamite
___Fans and Blowers
___Feeders
___Fifth Wheel Heavy Duty Special
___Flotation Equipment
___Front End Loaders
___Gasoline Engines
___Gear Reducers
___Generator Sets
___Grinding Media
___Gypsum Plant Machinery
___Hard Surfacing Materials
___Hoists
___Hoppers
___Kilns: Rotary, Shaft, Vertical
___Locomotives
___Lubricants
___Magnetic Separators
___Mills
___Pipe
___Pumps
___Scales
___Screen Cloth
___Screens
___Scrubbers: Crushed Stone, Gravel
___Shovels, Power
___Speed Reducers
___Tanks, Storage
___Tires and Tubes
___Torque Converters
___Tractor Shovels
___Tractors
___Trailer Dump Bodies
___Trucks, Bulk Cement
___Trucks, Industrial
___Trucks, Mixer Body
___Trucks, Motor
___Valves
___Vibrators
___Welding and Cutting Equipment
___Winches
___Wire Cloth
___Wire Rope

If equipment you are in market for is not listed above, write it in space below.

The principal rock product(s) manufactured by my company is/are indicated "1", "2", "3", in order of importance below.
___Crushed Stone
___Sand & Gravel
___Slag
___Cement
___Lime
___Gypsum
___Ready Mix Concrete
___Concrete Products Type_____
Other nonmetallic mineral (What?)_____
All above information is strictly confidential to be used to guide the manufacturers in supplying proper information.

Please Check Service Desired
☐ Have Salesman Call ☐ Literature only
☐ Prices ☐ By mail ☐ Urgent

NOTE: See—Where to Buy-Classified Advertising Section for used equipment and complete plant information

Name_____
Title_____
Firm_____
Street & No._____
City and State_____
Your Signature_____ Title_____

FILL IN—TEAR OUT—MAIL NOW! *BUYER RESEARCH SERVICE DEPARTMENT:* ROCK PRODUCTS 79 W. Monroe St. Chicago 3, Illinois

JOB RECORDS PROVE

Firestones meet schedules on the toughest projects!

Where it's rough going for every yard moved, Firestone tires turn downtime into worktime profit! That's because every Firestone off-the-highway tire is job engineered for the toughest duty. They're built with Firestone Rubber-X, the longest wearing rubber ever used in Firestone tires! Firestone S/F (Shock-Fortified) nylon or rayon bodies shrug off bruising shock and impact. Tough Firestone treads and sidewalls work through terrain that often ruins ordinary tires. Call your Firestone Dealer or Store and ask about the full line of Firestone tubeless or tubed off-the-highway tires. He'll recommend the tires that are built for your job! And remember, Firestone off-the-highway tires are backed with on-the-job service!

Rock Grip Excavator Wide Base

Rock Grip Excavator

When ordering new equipment always specify Firestone tires—available tubeless or tubed

Firestone

BETTER RUBBER FROM START TO FINISH

Copyright 1959, The Firestone Tire & Rubber Company

Enter 1266 on Reader Card

It's No Secret.. AUTOMATIC SAND PRODUCTION IS HERE

with the MECKUM-FLOATEX SAND MAKING & CLASSIFYING SYSTEM

- EXACTING CLASSIFICATION
- LOW INITIAL INVESTMENT
- AUTOMATIC OPERATION
- MAXIMUM EFFICIENCY
- RETAINS FINES
- FLEXIBILITY
- HIGH CAPACITY
- LOW LABOR COST
- AUTOMATIC BLENDING
- REMOVES CLAY & SILT
- HYDRAULIC CLASSIFICATION

SAVE MONEY ON EVERY TON OF SAND PRODUCED

With the Meckum-Floatex System you get all the advantages of low cost automatic operation with minimum maintenance.

The Meckum-Floatex Sand Making & Classifying System has the proven ability to operate from feed to stockpile by automation, and without such costly operating accessory equipment as screws, drags, wheels, rakes, conveyors, elevators, etc.

Get all the facts today

MECKUM ENGINEERING, INC.

Dayton Road
Ottawa, Illinois

Please send me the facts on how the Meckum-Floatex Sand Making & Classifying System can make 'spec' sand at rock bottom cost.

I am interested in a_____TPH system.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ **ZONE** ____ **STATE** _____

F-2

MECKUM ENGINEERING, INC.

Dayton Road
Ottawa, Illinois

53 W. Jackson Blvd.
Chicago 4, Illinois

Enter 1313 on Reader Card

Eldon P. Koetter

Advertising & Promotion Supervisor—Mine, Quarry & Railroad Markets Engine Division

Caterpillar Tractor Co. Peoria, Illinois

Profitable results through ROCK PRODUCTS advertising

Comments like those of Mr. Koetter, and other outstanding men who know the industry, point to the new importance of the new **ROCK PRODUCTS.** It is a *planned* importance that is making **ROCK PRODUCTS** the most talked about, most outstanding magazine serving producers in the $2.9 billion Rock Products industry. Now is the time to take a good look at the new **ROCK PRODUCTS.**

CATERPILLAR TRACTOR CO.

Caterpillar

PEORIA, ILLINOIS

November 6, 1958

REPLY TO
ENGINE DIVISION

Mr. P. D. Allen, Publisher
Rock Products Magazine
79 West Monroe Street
Chicago 3, Illinois

Dear Mr. Allen:

I am happy to advise you that the Caterpillar Tractor Co., Engine Division, has again selected ROCK PRODUCTS to carry its diesel engine advertising to producers of sand and gravel, rock and cement.

The editorial vitality of ROCK PRODUCTS, its new format, accurate reporting and high production standards result in high readership among producers who buy and use Caterpillar Diesels, and warrant our continued participation as an advertiser of engines.

In the final evaluation, our long record as an advertiser in ROCK PRODUCTS reflects the profitable results we have achieved by keeping your readers informed of advantages of Caterpillar Diesel Engines. You are to be congratulated on the splendid job you are doing in serving the important Rock Products industry, and those of us who supply it.

Very truly yours,

Eldon P. Koetter

Advertising & Promotion Supervisor
Mine, Quarry & Railroad Markets
Engine Division

EPKoetter
bh

DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

ROCK PRODUCTS
A MACLEAN-HUNTER PUBLICATION

79 W. MONROE STREET • CHICAGO 3, ILLINOIS

Also publishers of **CONCRETE PRODUCTS**
the new producer magazine

WHERE TO BUY

Rock Products Classified Advertising
—Where to Buy—

Mail to: ROCK PRODUCTS, Where To Buy Dept.,
79 West Monroe St., Chicago 3, Illinois

DATE_____

ADVERTISER_____

BY_____

ADDRESS_____

CITY, ZONE & STATE_____

Remittance Enclosed
Terms: 10 days after receipt of invoice

RATES FOR ONE INSERTION

Column Inches Used	Rate Per Column Inch
1- 3	$9.00
4- 8	8.60
9-14	8.40
15-19	8.20
20-30	7.80

Lower rates on a contract basis. Write for rate card.

Forms close 12th of Month Preceding Publication

ATTACHED COPY to appear in issue(s) checked

Jan. ..... July .....
Feb. ..... Aug. .....
Mar. ..... Sept. .....
Apr. ..... Oct. .....
May ..... Nov. .....
June ..... Dec. .....

SPECIAL ITEMS

C-R 5530 Twin roll, 200 HP elec. motor.
Iowa 53"x60" dbl. Impact hammermill
Traylor 56"x72" sectional frame jaw crusher
Symons 4' cone short head coarse bowl crusher.
C-S-30 mang. steel hammers. 50 TPH ¾"

CONCRETE MIXERS

2 Jaeger MDL. 168A. Port. Rubber tired.
Ransome Model 84S, 3 yd. tilting type
Smith 42S, 4 yd. tilting type
Koehring 56S 2 yd non tilting type

TRUCKS—TRANSIT MIXERS

15 Ford F8-6 yd. end dump. Excel. Reinforced, 1955
10 Mack LRSW 32 ton rear dump trucks Cummins NHIRS-600 300 HP Diesel Motor Allison converter-transmission.
6 Euclid 36 TD end dumps 300 HP Cummins Diesel
10 Euclid 28 FD rear dumps 15 ton cap. Cummins
13 Euclids rear dump 12 FD 15 ton; 7 Euclid bottom dump 43 RDT 15 ton
4 Jaeger Transit Mixers 5½ yd. Hi-Dis. New 1957
3 Jaeger 5½ yd. Hi-Dis. Autocar.

CRUSHERS—KILNS—DRYERS

JAW: Acme 10x20, 15x36, 14x26, 14x28, 10x42, 16x32, 18x32, 25x40. Eagle 10x16, 20x36. Diamond 24x36". Cedar Rapids 10x20, 15x36, 20x36, 25x40. Farrell 10x20, 15x30, 14x36, 18x36, 36x48. Buchanan Type C 30x42, 36x42. Traylor 18x36, 24x36. Allis-Chalmers 30x18. Good Reads 10x36. Telsmith 18x32. Universal 18x24.
GYRATORY: Al-Chal 6, 7½, 8, 9, 10, 12, 16, 18, 20". Telsmith TY 4', 5' Gyrosphere
25B Kennedy Van Saun 12, 37½; 38, 49¼"
ROLL: Cedar Rapids 40x20, Pioneer 40x22, 30x18, 54x24 triple roll; Telsmith 24x16. Universal 13x18
HAMMERMILL: Jeffrey Type B3 24x20, Type B 30x24, 36x36, 36x42, Eagle 24x24, Stedman 24x30, 36", 42". Cedar-Rapids 50-50, 30x33, 30x42.
BALL MILL: Hardinge conical 10'x48", 8'x48", 8'x36", complete, motors, Traylor 7'x35'.
TUBE MILLS: Smidth 6'6"x21', 5½x20'.
ROD MILL: Marcy 3'x8' center discharge, 8'x6', Jackson & Church 4'x10'
AUTOCLAVES: J&C 6'6"x58' Quick Acting; 6'x50'
CONE: Symons 3', 4¼" standard head coarse bowl
KILNS: 4'x42', 5'x30', 6'x50'6", 6'4"x45', 11'x155' Vulcan 9x100, 10'6"x105', 8'x124', 6'x90', 6'x72'.
DRYERS: 6'x60', 6'x72', 5'x24', 4'6"x32', 3'6"x20', 6'x30', 5'x35', 6'x24', 6'x40'.
COMPEB MILLS: A-C 7'x24', Patterson 7x18.
FEEDERS: Symatron FS5 48x72", 48x60", Jeffrey 35x72" Telsmith 36"x14', Universal 36"x32'

CRUSHING—WASHING—CLASSIFIER

Pioneer #6 Port. Crushing Plant, 10"x18" Model UD-2641H Diesel engine. New 1955.
Pioneer Port. 10x24 jaw 24x16 roll compl. Diesel
C-R 2540 Prim. Port. Diesel
Pioneer Special 34, 10x24 Jaw 24x16 Roll. Diesel.
C-R Primary Port. 22x36 Jaw. Diesel.
Eagle 36x25' single screwspiral etc.
Lippman Port. WASHMORE washing plant, 36"x 16' sand classifier, 48"x72" revolv. scrubber etc.
Diamond Wes-Con port. Primary 20"x36" crusher
C-R Port. Prim. 20x36" Diesel R. B.
Eagle BMC Log Washer 48"x20' GM Diesel
Eagle 24'x25' dbl. screw washer 15 HP motor

CONCRETE PLANTS AND EQUIPMENT

Noble CA 354, 4 compts. Complete Large cap. 350 tons 1954
Erie-Strayer 120 ton aggr. bin 880 bbl silo ground storage 1300 bbl silo
B-K P2100 3 compt. aggr. Heltzel 450 bbl cement
Erie-Strayer PG 3 compt. 195 tons aggr. bin; cement silo 675 bbls. cement interlocking
Erie Strayer port. New 1955, 40 yds. per hr. 600 bbl. cement silo
Johnson 400 yd 5 aggr. 1500 bbls. cement batch 5000 bbl. silo 2-2 yd mixers
Johnson automatic batch 10,000 bbls. cement storage 3-2 yd mixers; screening equipment.
Johnson TY 228 2 compt. agg. w/TY1320 cement unit
Erie—Strayer 2, 50 T. compts. 880 bbls. cement 750 bbl. silo.
Johnson TY-227 70 cu. yd. 105 ton 3 compt. aggr. bin TY168 batcher.
Blaw-Knox BCPC 600 bbl cement silo
Blaw-Knox BCPC 300 bbl cement bin
B-K 8 Comp. 200 yd. ag. bin, cement silo 3000 bbls., 2 Koehring 56-S mixers.

SUCTION DREDGES FOR SAND-GRAVEL

Morris 6" Diesel on 14'x36' hull
Gu. Iron Works 8" suc. 6" disc. Diesel New 1957.
10" Portable Diesel powered. Complete.
Amsco 12" suc. 10" Dis. Hull 24'x50' Diesel-Elec.
Ellicott 8" with cutter. Diesel Hull 48'x18'x3'6"
8" Hydraulic Diesel. On 32'x8' steel pontoons
6" portable Diesel complete with cutters, etc.

SCREENS

Tyler-Hummer 4'x10' 2 Deck
New Symons 3'x12' 5 HP. Elec. Motor.
Pioneer 5'x12' 3 deck spring suspension
Cedar Rapids 4'x12' dbl. deck 25 H.P. elec. motor
Pioneer 5'x12' 2 deck 20 HP elec. motor
C-R 4'x14' 2 deck 25 HP motor

RICHARD P. WALSH CO.
30 Church St. New York 7, N. Y.
CO 7-0723 Cable: RICHWALSH

$2,000,000 LIQUIDATION BRIQUETTING PLANTS

4—Ruggles-Coles Class #XA-18 double shell indirect-direct heat rotary dryers, 104" x 70' x ⅝" shell.
4—Komarek-Greaves, briquetting presses, 75 HP, 25 tons per hour.
4—Komarek-Greaves vertical Fluxers (paddle mixers), 150 HP.
4—K-G Horiz. Fluxers, 41" dia., 50 HP.
4—K-G Pug Mills, 30" dia. x 14'4".
8—Tyler Screens, 4' x 8', 4' x 6'.
2—42" wide traveling-screen cooling conveyors, total of 950'.
4—36" x 24", 24" x 18" Jeffrey hammermills, 50 HP, 25 HP.
6—Robinson Sawtooth Crushers.
2—Pa. Crusher #C-3-30 hammermills.
20—Welded Steel bins, cone bottom, from 15,000 gallon to 90,000 gallon.
4—Keeler Boilers 200 HP, 160 PSI.
8—16", & 24" trough-belt conveyors, 100', 250', 500' long.
6—36" & 48" apron feeders, 8' long.
8—Bucket elevators, 62' and 90' c-c.
6—500 KVA Transformers.

PERRY EQUIPMENT CORP.
1418 N. Sixth Street
PHILADELPHIA 22, Pa.
Phone: POplar 3-3505

HEAT & POWER CO., INC.
60 E. 42nd Street
NEW YORK 17, N. Y.
Phone: MUrray Hill 7-5280

FIRST CLASS EQUIPMENT FROM YOUR FIRST SOURCE

CENTRIFUGALS; Bird cont. conical; 18"x28"; 24"x38" and 32" x 50"; also Suspended Centrifugals with Imp. or Perf. Baskets

FILTERS and **FILTER PRESSES** S.S., Ni-Resist and Wood P. & Frame Filter Presses; Sweetlands, Eimco, Oliver Dorrco Rotary Vac. Filters

DRYERS: Louisville in S/S 30"x28'; S/S Rot. 50"x20'; Proctor & Schwartz Stainless 8' Apron Dryers; 34' long; Send for List.

KILNS; Refractory Lined; all sizes to 11'x155'; Send for List.

CRUSHERS-PULVERIZERS: Jaw, Cone, Roll, Hammer Mills Williams Lab. Hi-Side 3 Roll Pulverizer comp.

We Welcome your Inquiry

FIRST MACHINERY CORP.
209-289 Tenth St. Bklyn. 15, N.Y.
STerling 8-4672

NOW BEING DISMANTLED WINGDALE, NEW YORK

2—Kilns 8' x 125' Complete w/Drives
1—Kiln 5' x 35' Complete w/Drive
2—Coolers 5' x 60' Complete w/Drives
1—A-C Ball Mill 4x6' Complete w/Drive
1—Hardinge Mill 6' x 12' Complete w/Drive
2—Raymond High Side Roller Mills Complete w/Drives, Piping, Blowers & Cyclones.
1—Abbe Rod Mill 3' x 12' Complete w/Drive.
4—Lancaster EAG-4 Mixers Complete w/Drives
1—Lancaster EAG-3 Mixer Complete w/Drive.
1—Raymond #0000 Pulverizer Complete with Piping, Cyclone, Drive.
1—Briquetting Press Complete w/Drive, Feed Hopper, Etc.
2—Solas Gas Furnaces.
6—A-C 500 KVA Transformers 13800 to 480 V.

MISC. ELECTRICAL EQUIPMENT
BUCKET ELEVATORS—MOTORS
CONVEYORS—ETC.

—CONTACT—

Samuel Sons Iron & Steel Co.
Phone: Evergreen 8-4880
(Brooklyn, New York)

LARGEST SELECTION

ROTARY KILNS—DRYERS—COOLERS

1—Traylor 11' x 155' Rotary Kiln, 7/8" shell.
1—Vulcan 10' x 8' x 125' Rotary Kiln, 5/8" shell.
1—Allis Chalmers 9' x 130' Rotary Kiln, 3/4" shell.
4—Vulcan 8' x 125' Rotary Kiln, 5/8" shell.
1—Vulcan 8' x 87', 1/2" shell.
3—Louisville 8' x 50', 3/8" steel shell with 1/8" stainless steel lining.
2—Vulcan 7' x 80', 1/2" shell.
2—Vulcan 7' x 55', 5/8" shell.
1—Link Belt Roto Louvre Dryer, 7'5" x 24', monel.
2—Link Belt Roto Louvre Dryers, 6'4" x 24', stainless.
1—Allis Chalmers 6' x 60', 1/2" shell.
1—Rennenberg 6' x 50', 3/8" shell.
1—Rennenberg 5'6" x 50', 3/8" shell.
1—Ruggles Cole 5' x 30', class A-8, Indirect Heat Dryer, 3/8" shell.
1—Allis Chalmers 4' x 40'.
1—Allis Chalmers 4' x 30', 3/8" shell.
2—Ruggles Cole 4' x 20', 3/8" shell.
1—Link Belt Roto Louvre Dryer, 3'10" x 20'.
1—34" x 30', 1/4" shell.
1—Traylor 30" x 18', 1/4" shell, 430 S.S.

MILLS—CRUSHERS—PULVERIZERS

2—Traylor Compeb Mill 7' x 27' with 1—500 HP & 1—600 HP motor 3/60/440.
1—Williams Hammermill, 300 HP.
1—Allis Chalmers 6' x 22' Tube Mill, 250 HP.
1—Smidth 6' x 20' Tube Mill, 300 HP.
1—Smidth 5'6" x 21' Tube Mill.
1—Hardinge 4½' x 24" Steel Conical Ball Mill.
1—Denver 3' x 5' Continuous Ball Mill with steel liners.
1—Telsmith Reduction Crusher No. 46, 50 HP.
3—Kennedy 54" x 24" Two Roll Crushers.
2—Kennedy #6 Gyratory Crushers, 50 HP.
5—Jaw Crushers 12" x 18" to 36" x 48".
1—Penn. Non-Clog Swing Hammermill, size 5060, Hopper opening 47" x 60", cap. 200—275 tons per hour, requires 400 HP motor, UNUSED.
1—Penn. Super-Thor Hammermill, size 5XT13, 250 HP.
5—Raymond Bowl Mills, Two Roll, 60 HP.
3—Bradley Hercules Mills 6', Three Rolls, 300 HP.
3—Raymond 5 Roll Low Side Mills.

AIR SEPARATORS—SCREENS

1—18' dia. Raymond Double Whizzer Separator with 100 HP motor.
1—14' dia. Raymond Double Whizzer Separator with 60 HP motor.
1—Gayco 8' dia. mechanical Air Separator.
1—Raymond 30" dia. Double Whizzer Separator.
1—Dracco Dust Collecting System type DAAA-3 with Dracco Perfecto Filter #19 Clarage exhaust fan 2000 cfm, 10 HP motor.
1—Tyler Hummer Screen 4' x 10' type 38 with V-52 Vibrators and Thermionic unit.

ELEVATORS—CONVEYORS

14—Link Belt bucket chain Elevators 22' to 60' high.
1—24" Troughing Belt Conveyor 75', 7½ HP.
1—Robins 84" x 22' Feeder Conveyor, 15 HP.
1—Robins 24" x 14' Belt Conveyor, 3 HP.
1—Robins 18" x 30' Troughing Conveyor.
1—Fuller-Kinyon Conveying System type H257, 100 HP.
2—Fuller-Kinyon Conveying Systems type 10B-No. R, 75 HP.

For inquiries on Boilers, Diesel Generator Sets, Turbo Generator Sets, Steam Engines, write to our Department P-1.

BRILL EQUIPMENT COMPANY
2401 Third Avenue, New York 51, N.Y.
Tel: CYpress 2-5703

QUARRY EQUIPMENT

Cedarapids 4A, 2540 Jaw Portable Primary.
Cedarapids 1236 Twin Jaw Crusher.
Cedarapids 6C, 1236 Twin Jaw Portable Secondary.
Cedarapids 3033 Hammermill rebuilt.
Cedarapids 2033 Hammermill. Slightly Used.
Telsmith 36" Gyrasphere Crusher.
Williams No. 40 slugger type pulverizer
26" x 8'4" apron feeder with drive.
Robins 4' x 9' triple deck screen.
2 Cedarapids DDD units with 4' x 12' 2-deck screens on 8' x 18' 2-compartment bins, connecting conveyor.
Cedarapids 30-S, 3-compartment Charging Hopper, Apron Feeder, Bucket Elevator. New.
Smithco 10' x 10' single compartment bin.
Pioneer 4' x 8' double deck screen. Rebuilt.
27½ ton, single-compartment 8' x 13' bin.
1—Eagle 36" x 20' Double Log Washers. Good.
Wemco 24" x 13' Sand Preparation Machine.
60-ton, two-compartment, 8' x 18' storage bin with clam gates.
100-ton, two compartment, 13' x 22' bin
Special bins to your specifications.
Conveyors—18"—24"—30"—36". Also conveyor belting.

SHOVELS AND CRANES

P & H 855B-LC, 2-yd. diesel dragline.
P & H 655B 1½ yd. diesel dragline reconditioned.
Bucyrus-Erie 38B, 1½-yd. Diesel Dragline.
Lorain L-26, ¾-yd. Diesel Dragline. Excellent.
Lorain L-25A, ¾-yd. Gas Backhoe.
Lorain L-25K, ¾-yd. Gas Crane.
Koering 304, ¾-yd. Diesel Shovel-Backhoe.
P & H 255A, ¾-yd. Diesel Clam-Crane.
Lima 34 Paymaster ¾-yard diesel shovel. Good
Unit 1620 ¾-yard diesel powered shovel-crane
Unit 614, ½-yd. Diesel Backhoe.
American 180, ½-yd. Gas Clam-Backhoe.
Lorain TL-20, ½-yd. Diesel Backhoe.
Lorain MC-414 20-ton Moto-Crane reconditioned.
Link Belt HC-90 25-ton truck crane
Michigan TLDT-20, 20-ton Truck Crane
Lorain MC-4 15-ton Moto-Crane.
Lorain SP-107, 7-ton self-propelled crane

TRACTORS, TRUCKS, SCRAPERS, ETC.

1—Euclid TS-18, 18-yd. twin engine scraper.
1—Euclid 7-yd. overhung engine scraper.
1—Euclid 15½-yd. six wheel scraper.
2—Euclid 13-yd. bottom dumps. Good.
1—Euclid TC-13 twin engine tractor.
4—Euclid 80FD, 15-ton rear dumps
1—Mack LRS 15-ton rear dump. Rebuilt
2—Allis Chalmers TS-360, 15-yd. overhung engine scrapers
1—International TD 18 with cable bulldozer
1—Euclid tractor with 3200 gallon water tank
1—Caterpillar D-8 with push block
1—Caterpillar D-7 with bulldozer, crane boom.
1—Cat. D-7 with Hydraulic Angledoser Blade.
1—Cat. D-6 with hydraulic angledoser blade.
1—Caterpillar D-4 Tractor only
1—Internat'l. 300 tractor, with loader backhoe.
1—Allis-Chalmers HD-19 with cable bulldoser
1—LaPlante choate 13½-yd. Cable scraper
1—Atco H85, 10½-yd. Hydraulic scraper
1—Hough Hr, 1-yd. Gas Front End Loader.
1—Caterpillar 112 diesel grader
2—Caterpillar 12 diesel graders
1—Letourneau super C Tournadoser. Excellent.

SHOVEL ATTACHMENTS

Lorain 82 or 820, 2-yd. 23' boom, 20' stick
Lorain 50, 1-yd., 21' boom, 17' stick
Lorain 30A, ½-yd., 16' boom, 13'4" stick.
Osgood 903, 2-yd., 24' boom, 20'6" stick.

BACKHOE ATTACHMENTS

Lorain 30 or 40, 16' Boom, 7' Stick, 44" Bucket.

DIESEL POWER UNITS

Cat. D7700, 74 H.P. at 1000 RPM. Rebuilt
Cat. D13000, 128 H.P. at 1000 RPM. Rebuilt.
GM 3021C, 3-cylinder, new.
GM 671, 6-cylinder, rebuilt.
GM Twin Diesel, rebuilt.

GENERATOR SETS

Universal 5KW, 1200 RPM, D.C., 220-250 Volts.
Century-Waukesha 15 KW, 1200 RPM, 3/60/127-220.
Century-Continental 15KW, 1200 RPM, 3/60/120-208.
Cummins 25KW, 1200 RPM, 3/60/120-208.
Caterpillar 40KW, 1200 RPM, 3/60/220-440

AIR COMPRESSORS

105 cu. ft. LeRoi tractair with doser, backhoe.
2—105 cu. ft. Ingersoll Rand Gas Portable.
3—125 cu. ft. Gardner-Denver Gas Portables.
125 cu. ft. Jaeger gas portable.
210 cu. ft. Schramm gas portable.
210 cu. ft. Gardner-Denver Diesel Portable.
315 cu. ft. Schramm gas portable.
600 cu. ft. Ingersoll-Rand. Waukesha power
2—600 cu. ft. Gardner-Denver diesel portables.

L. B. SMITH, INC.
Camp Hill, Pa.
Phone Harrisburg REgent 7-3431

PRICED TO SELL

KILNS—COOLERS—DRYERS

7'x50' Ruggles-Cole Rotary Dryer
7'x60' Bonnot Rotary Dryer
8'8"x70' Ruggles-Cole Rotary Dryers
8'x115' Vulcan Rotary Kiln
8'x125' & 8'x100' Rotary Kilns
11'x155' Traylor Rotary Kiln
6'x50' & 6'x25' Rotary Dryers
705-24, 502-16 Roto Louvre Dryers

MILLS—PULVERIZERS—CRUSHERS

Jeffrey Hammermills 15"x8" to 24"x18"
Pennsylvania C-3-30 Hammermill 60 HP
Dixie Jr. 2424 Non-Clog Hammermill
Williams 60GA Hammermill 300 HP
Diamond 30"x42" Jaw Crusher 125 HP
Raymond 5 Roll Low Side Mills
Raymond #6669 High Side 6 Roll Mill
Hardinge 10'x48" & 8'x30" Conical Mills
14' Gayco Dust Collectors
Tube Mill 6'6"x21'—350 HP Synch.
30"x14' & 40"x13' Pug Mills

MISCELLANEOUS

Clyde Hydrator #3 complete
18"x16'; 36"x6'; 48"x8' Apron Feeders
24"x18' Pan Feeders
60' to 90' Centers Bucket Elevators
2000'—16" to 42" Belt Conveyors
4'x6' & 4'x8' Tyler Hummer Screens
15 to 200 ton cap. Steel Bins
10 ton Gas/Elec. Locomotive 36" ga.
25 ton Diesel/Elec. Locomotive 36" ga.

Write for Detailed Booklet

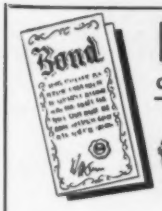
HEAT & POWER CO. inc.
ROCK PROD. EQPT. DIV.
60 East 42nd St., New York 17, N.Y.
310 Thompson Bldg. Tulsa 3, Okla.

RELIABLE HEAVY EXCAVATION EQUIPMENT

Draglines—Shovels—Cranes—Drills—Trucks

15-W Bucyrus Erie Elec. Drag, 215', 13 yd.
9-W Bucyrus Erie Elec. Drag, 160', 11½ yd.
9-W Bucyrus Erie Diesel Drag, 200', 9 yd.
7400 Marion Diesel Drag, 175', 13 yd.
7400 Marion Elec. Drag, 175', 12 yd.
625 Page Diesel Drag, 150', 10 yd.
621-S Page Diesel Drag, 125', 7 yd.
200-W Bucyrus Erie Diesel Drag, 125', 6 yd.
5-W Bucyrus Erie Diesel Drag, 100', 6 yd.
2400 Lima Dragline, 130', 5 yd.
4500 Manitowoc Drag, 120', 5 yd.
120-B Bucyrus Erie Elec. Drag, 115', 5 yd.
111-M Marion Drag, 100', 4 yd.
1601 Lima, 4 yd., Shovel/Drag
3900, 3500 & 3000 Manitowoc Cranes
5560 Marion 26 yd. Elec. Shovel
750-B Bucyrus Erie 20 yd. Elec. Shovel
5480 Marion 18 yd. Elec. H. L. Shovel
151-M Marion 7 yd. Elec. Shovel
170-B Bucyrus Erie 6½ yd. Elec. Shovel
4161 Marion 6 yd. Elec. Shovel
2400 Lima 4½ yd. H. L. Shovel
120-B Bucyrus Erie 4 yd. Elec. Shovel
4500 Manitowoc 5 yd. H. L. Shovel
111-M Marion Standard & H. L. Shovels
3500 Manitowoc Standard & H. L. Shovels
54-B Bucyrus Erie Standard & H. L. Shovels
Large selection of smaller Shovels & Draglines available
Model T-750 Reich Truck Mounted Rotary and Down-the-Hole Drill
McCarthy & Compton Coal Auger Drills
Euclid trucks, truck cranes, dozers, scrapers, front end loaders, attachments and other misc. equipment available

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

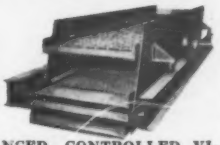


BONDED QUALITY BARGAINS

CURRENT MODELS - IMMEDIATE SHIPMENT FROM OUR FACTORY - WRITE, WIRE OR PHONE FOR FREE CATALOG AND PRICES

BONDED® GENERAL DUTY AND HEAVY DUTY VIBRATING SCREENS

More than 7000 Mines and Quarries have modernized with Bonded Equipment



PERFECT BALANCE AND SHARP ACTION. Eccentric weight mechanism, spring mounted. 1 to 3 decks, 2′ x 4′ to 3′ x 8′. **WRITE FOR "SEVEN SECRETS OF SUCCESSFUL SCREENING" IN BULLETIN NO. 1086.**

Model Number	Screening Area	No. of Decks	Sale Price
124A	2′x4′	1	$ 443
224A	2′x4′	2	472
126A	2′x6′	1	472
226A	2′x6′	2	501
134A	3′x4′	1	504
234A	3′x4′	2	570
136A	3′x6′	1	581
236A	3′x6′	2	688
336A	3′x6′	3	956
138A	3′x8′	1	675
238A	3′x8′	2	815
338A	3′x8′	3	996

FACTORY BALANCED, CONTROLLED VIBRATION. Four bearing positive throw eccentric shaft: 3′ x 6′ to 5′ x 14′. 1 to 5 decks. **WRITE FOR BULLETIN NO. 1087 AND 9 REASONS WHY BONDED IS YOUR BEST BUY.**

Model Number	Screening Area	No. of Decks	Sale Price
336B	3′x6′	3	$1620
436B	3′x6′	4	1685
138B	3′x8′	1	1510
238B	3′x8′	2	1620
338B	3′x8′	3	1735
248B	4′x8′	2	2310
348B	4′x8′	3	2440
2410B	4′x10′	2	2400
3410B	4′x10′	3	2550
2412B	4′x12′	2	2590
3412B	4′x12′	3	2970
4412B	4′x12′	4	3165

BONDED® TROUGHING IDLER CONVEYOR BARGAINS

CONVEYOR PRICES INCLUDE BELTING

Complete Pre-Fab sections of 8" Jones & Laughlin Jr. I Beam Frame Conveyors quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams, with .20% Copper have as much as four times the resistance to corrosion as non-copper steels. Braced with structural angle, welded to frame for maximum rigidity. Equipped with 5" roll diameter idlers and return rolls, 20" diameter head pulley and 16" diameter tail pulley, mounted on 2¼" or 2⅞" diameter shaft.

We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28 oz. duck, 1/16" top rubber cover x 1/32" bottom cover Major grade belt and is Fresh Stock made by leading manufacturers. WRITE FOR BULLETIN #1135.

Bonded troughing idler conveyors also available in Truss Frame Construction. WRITE FOR BULLETIN #1139 AND PRICES.

Belt Width	Length of Conveyor	List Price	Sale Price	Add or Deduct Per Ft.
14″	25′	$1397	$ 738	
14″	50′	2222	1159	$16.84
14″	85′	3377	1748	
16″	20′	1262	667	
16″	45′	2137	1118	
16″	60′	2662	1388	18.04
16″	90′	3712	1930	
18″	25′	1477	797	
18″	45′	2217	1182	
18″	70′	3142	1663	
18″	85′	3697	1952	19.24
18″	100′	4252	2240	
18″	130′	5362	2817	
20″	25′	1517	835	
20″	60′	2882	1548	
20″	75′	3467	1854	20.37
20″	90′	4052	2159	
24″	25′	1590	898	
24″	45′	2430	1234	
24″	70′	3480	1878	
24″	100′	4740	2532	21.78
24″	120′	5580	2967	
24″	150′	6840	3621	
30″	50′	2911	1617	
30″	70′	3871	2112	24.75
30″	90′	4831	2607	
36″	25′	1818	1118	
36″	45′	2858	1677	
36″	60′	3638	2096	27.95
36″	100′	5718	3214	

BONDED® QUALITY BUILT BUCKET ELEVATORS

ENCLOSED ELEVATOR

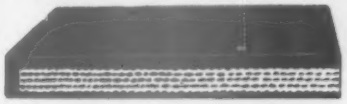
Open or Enclosed, Vertical or Inclined Bucket Elevators with Continuous or Spaced Buckets mounted on Chain or Belting. Bonded's 19 standard models are designed for low cost, high capacity elevating of practically all bulk materials. Open and other types priced on request. There is a style of bucket for virtually every material or condition: wet or dry, lumpy or fine, granular, slivery, or pellet shapes, hot or chemically active. Prices listed at right are for Vertical Enclosed Elevators. Standard Elevators with Chain mounted buckets use #477 or #C102B combination chain. 4, 5 and 6 ply, 32 oz. or 35 oz. duck belt is used on Belt mounted Bucket Elevators. Bonded Bucket Elevators are Jig Built to insure easy Job-Site Installation.

Model No.	Bucket Size Inches	First 20′ (Discharge Ht.)	Add or Deduct Per Ft.
Style "A" Spaced Malleable Buckets on Chain			
C53A	5x3½	$1071.50	$20.25
C64A	6x4	1088.50	21.00
C85A	8x5	1235.00	25.50
C106A	10x6	1281.00	27.50
C127A	12x7	1510.00	31.25
C148A	14x8	1673.50	36.00
Style "A" Spaced Malleable Buckets On Belt			
B53A	5x3½	$1099.00	$20.50
B64A	6x4	1116.50	21.25
B85A	8x5	1311.50	27.25
B106A	10x6	1692.50	33.00
B127A	12x7	1854.50	37.25
Style "E" Continuous Steel Buckets On Chain			
C85E	8x5x 7⅞	$1397.00	$31.25
C126E	12x6x11⅞	1599.00	34.25
C108E	10x8x11⅞	1604.00	34.75
C128E	12x8x11⅞	1624.00	35.50
C148E	14x8x11⅞	1710.00	36.75
Style "E" Continuous Steel Buckets On Belt			
B85E	8x5x 7⅞	$1727.50	$34.50
B116E	11x6x 8⅝	1839.50	38.75
B128E	12x8x11⅞	2013.00	43.50

A complete line of parts and accessories available to build your own Bucket Elevators. Continuous Steel, Salem Steel and Malleable Iron Buckets available in a wide variety of sizes, shapes, gauges and styles at low prices. WRITE FOR BULLETIN #1202 AND PRICES DESCRIBING COMPLETE LINE OF BUCKET ELEVATORS AND BUCKETS.

NEW CONVEYOR BELTING SAVE UP TO 34%

WE PAY FREIGHT ON 200 POUNDS OR OVER



QUALITY TESTED CONVEYOR BELTING*

Major Brand: 12# to 15# Average Friction Pull. 800# to 1000# Average Cover Tensile.

Heavy Duty 4-ply, 28-oz. duck, 1/16" top rubber cover x 1/32" bottom rubber cover belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stocks.

Width	Ply	List Price	Sale Price
14″	4	$3.63 ft.	$2.83 ft.
16″	4	4.08 ft.	2.97 ft.
18″	4	4.51 ft.	3.29 ft.
20″	4	4.97 ft.	3.80 ft.
24″	4	5.85 ft.	4.26 ft.
30″	4	7.18 ft.	5.21 ft.
36″	4	8.51 ft.	6.18 ft.

Major Bee Brand: 16# to 19# Average Friction Pull, 2400# to 3000# Average Cover Tensile. Skim coat between plies.

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, 1/16" top rubber cover x 1/32" bottom rubber cover. These belts are for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal, and other similar materials, both wet and dry. Belts have molded rubber edges.

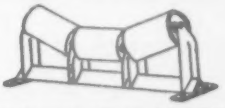
Width	Ply	List Price	Sale Price
14″	4	$ 4.31 ft.	$3.06 ft.
16″	4	4.85 ft.	3.46 ft.
18″	4	5.39 ft.	3.83 ft.
20″	4	5.90 ft.	4.37 ft.
24″	4	6.94 ft.	4.94 ft.
30″	4	8.53 ft.	6.07 ft.
36″	4	10.09 ft.	7.35 ft.
24″	5	8.14 ft.	5.78 ft.

***All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.**

Other widths, plies, duck weights and cover thickness available at low prices.

WRITE FOR FREE SAMPLE & BULL. #1234

BONDED® IDLERS AND RETURN ROLLS SAVE 25% AND MORE



3-roll, 5" diameter Troughing Idlers for:

14" belt	$19.75	24" belt	$22.75
16" belt	20.50	30" belt	23.85
18" belt	21.90	36" belt	24.90
20" belt	22.10	48" belt	27.50

1-roll, 5" diameter Return Rolls for:

14" belt	$ 8.50	24" belt	$11.00
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	13.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable prelubricated sealed ball bearings. Maintenance is negligible. **WRITE FOR BULLETIN #1138.**

BONDED SCALE AND MACHINE COMPANY

PHONE Days: Hickory 4-2186 — **WRITE FOR FREE CATALOG AND PRICES** — **PHONE Evenings: AX. 1-2213, HU. 6-3156**

128 Bellevue — **Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders** — **COLUMBUS 7, OHIO**

UNIVERSAL 203QH4 Senior Portable Plant w/2036 Jaw, 3x8 feeder, 4x12 2-deck screen, rotovator, 30" conveyors, 26x36 hammermill, two Cat. D337F diesel power units, tandem rubber, late model, like new. Save over 30%. $48,500 Terms.

CEDARAPIDS 4230 IMPACT SEMI-PORTABLE Plant w/42"x12' Apron feeder, 36"x50' conveyor, completely electric powered dustproof motors, all mounted gooseneck steel frame. Ser. 15405, new 1955, like new condition. Capacity 250-400 tph. Less ⅓ new price. $37,500

CEDARAPIDS IMPACT Portable Plant 30x42 Feed Opening, with 16' apron feeder, 30" under-conveyor, International 1691 diesel, factory tandem rubber. Good. $21,500

CEDARAPIDS 2540 Jaw Portable Primary Plant w/10' apron feeder, conveyor, Cat. D13000 diesel, mounted factory tandem rubber. $18,500

ROGERS SCREENING & Crushing Plant, portable, w/4x10 2-deck vibrating screen, rotovator, 3033 Hammermill, Cat. D13000, plant & delivery conveyors, mounted tandem rubber. $8500

PIONEER Type 16T40 Portable Gravel Plant, w/1016 rb. Jaw, 1616 rb. rolls, 3x8 2 deck vibr. screen, portable field conveyor w/feeder, two delivery conveyors, UD14 diesel, pneumatic tires. $7000

LIMA 34 Paymaster Shovel, ¾ cy, #327775, used only 800 hrs., in govt. storage, like new. $12,500

LINK BELT LS85 Shovel, ¾ cy. #7A1334, new 1951, Cat. D318 diesel. $6850 Yard.

SHOVEL FRONTS for P&H 655B, new, complete. $4850. P&H 655, good. $3000. Unit 1620, new $1250. N.W.25, complete, excellent. $1750. Orton 2 cy. complete, new, fit other makes. $2800

SHOVEL BUCKETS for P&H 655, new, 1½ cy. fit other makes. $1000. Also Amsco 2 cy. new buckets for Orton, fit others. $1250 Yard.

BARBER GREENE 522 Bucket Loader, on rubber. $1250

APRON FEEDERS, Cedarapids 3x8 w/clutch. $1500. Cedarapids 3x6½, w/hopper and drives. $1500. Telsmith 42" x 12'. $1600

VIBRATING SCREENS, Simplicity 4x12 2-deck, new bearings, motor. $1650. Deister 4x8 2-deck, new, save 40%. $2250. Deister 3x8 2-deck w/motor like new. $1250. Telsmith 3x10 2-deck w/motor, overhauled. $1250. Symons 3x10 2-deck. $850. Symons 3x12 2-deck. $950. Lippman 4x12 single. $850. Seco 3x8 2-deck. $750. Allis-Chalmers Lo-head horizontal 4x8 2-deck. $1000.

CONVEYORS, Cedarapids 30"x40' complete, less motor. New. $1950. Cedarapids 18"x35', complete, less motor. New. $1500. Atlas 24"x50' lattice type, complete, new. $2200.

COMPRESSORS, Ingersol 600 cfm Rotary, portables. $7000. Gardner Denver 500 cfm portable, #13505, excellent. $4000. Ingersol 315 cfm Portable, Diesel, UD18 engine, rebuilt, $2850. Davey 210 cfm portable diesel, rebuilt, late model. $2000. Rent $200-$500 per month, apply purchase.

DRILLS, Worthington UM40 Wagon Drills, brand new, ⅓ price, $1500. Worthington #56 Jackhammers, brand new, less ⅓ price. $200

WENZEL MACHINERY COMPANY
563 S. 10th, Kansas City, Kans. Mayfair 11710

TITANIUM PLANT

1—Traylor 11' x 155' Rotary Kiln, 2 tires, welded, 7/8" shell.
Steel building housing above kiln 32' x 202' x 40.

1—Vulcan 8' x 50' Rotary Kiln, 2 tires, welded, 7/8" shell.

2—Vulcan 6' x 60' Rotary Kilns, 2 tires, ¾" shell.

2—Abbe 5' x 16' Ball Mills.

3—Bucket Elevators; 125', 32', 30'.

2—Aurora 24" Vertical Centrifugal Pumps, 200 HP motors, 5000 gpm, 125' head.

1—Bemis Automatic Bag Packer, Sewing Machine, Conveyor and Flattener.

1—Byron Jackson Deep Well Pump, 75 HP Vertical Motor.

1—8' x 8' Oliver Precoat Filter.

6—Dorr Thickener Mechanisms, 16'.

18—Steel Buildings 20' to 80' wide x 60' to 140' long.

2—20 ton Overhead Cranes, 30' & 35' spans.

8—Redler Conveyors; 30', 35', 40', 75', 80' and 125' long.

200'—Screw Conveyor, 9" and 12".

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NINE CRANES & SHOVELS

Insley "K-12" Used ½ yd. Trench Hoe or Crane, 18" shoes, 8'2" wide, new 10/52, M.M. Gas power, hoe attachment rebuilt, bucket is new.
Lorain "TL-25K" ¾ yd. Crane or Dragline, Cat D315 power, 1951 model. Rebuilt.
Koehring "304" Used Diesel Shovel.
Northwest "25" Used ¾ yd. Diesel Dragline.
Bantam "M-49" Used ⅜ yd. Trench Hoe, mounted on Half Track (4).
Bantam "T-35" Used ¾ yd. Trench Hoe, mounted GMC 6x6.
P&H New Shovel Attachment for "255A". Never used. Discounted to sell.

THREE FRONT END LOADERS

Hough "HF" Used ¾ yd. Payloader, gas power.
Terratrac "500" Used Crawler Tractor-Shovel, hyd. controlled.
Caterpillar "D-2" Used Diesel Tractor w/Cable Traxcavator. Selling for parts.

EIGHT TRANSIT MIXERS

Jaeger 5 Yd. Mixers (2), Continental power, sealed door, rear water entry, unmounted, or mounted on LF172 & LF192 Trucks.
Jaeger 5 Yd. Mixer, Continental power, rear water entry. Looks like new, un-mounted.
Smith 5 Yd. Mixer, Continental power, sealed hopper, front water entry, un-mounted or mounted on White "2264" Truck.
Smith 4½ yd. Used Mixer, Continental power, mounted on Dodge Tandem Truck.
Rex 4½ Yd. Used Horizontal Mixer, power take-off w/tower. Good one for mixing fertilizer.
Rex 3 Yd. Used Mixer, Continental power, mounted or un-mounted.
Jaeger 3 Yd. Used Mixer, Continental power, mounted Dodge Tandem Truck.

CRUSHING EQUIPMENT

Cedarapids "4033" Secondary Plant, Plate Feeder, rotovator, 4033 Hammermill, 4x12 screen, chip conveyor, 3-axle, D-4600 Diesel power.
Dixie Port. Pulverizing Plant, 3x8 Feeder, 3x8 Cedarapids Screen, 3036 mill, 30" under-discharge conveyor, GM "671" diesel power unit. 6 Years old. Overhauled.
Gruendler Used Portable Pulverizer Plant, w/3x8 Apron Feeder, Gruendler 3XB Mill, 30" under-discharge conveyor, 3 axles, 1957 model. Also with Onan 35 KW Generator set on 2 axles. This is a producer and is priced "real right".

MISCELLANEOUS

LaCrosse 16-Ton Tandem axle Low Boy, tires good, air brakes.
Homade 5-ton Tilt Top Trailer.
Rogers 15-Ton Low Boy Tandem Axle Trailer, rebuilt.
Malsbary 250-CES New Steam Cleaner. Reduced to sell!

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EIGHMY EQUIPMENT COMPANY
ROCKFORD, ILLINOIS

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60"x48" to 6"x3"
New and used RELIABLE

"Farrel-Bacon" Jaw Crushers

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BEST BELT BUYS

2500-3000# cover tensile, 16-19# friction pull. Brand new, factory guarantee, 3 weeks delivery.

		LIST	SELL
4 ply 28 oz. duck:			
14"	⅛" x ⅓"	$4.31	$2.42
16"	⅛" x ⅓"	$4.86	$2.72
18"	⅛" x ⅓"	$5.40	$3.02
18"	⅛" x ⅓"	$5.69	$3.19
20"	⅛" x ⅓"	$5.90	$3.32
24"	⅛" x ⅓"	$6.95	$3.90
4 ply 32 oz. duck:			
24"	⅛" x ⅓"	$7.79	$4.36
30"	⅛" x ⅓"	$9.58	$5.36

Many other sizes. Ask for samples. Distributors protected.

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New Bulk Cement Trailers
3—Gravity 6—Auger
Designed for 50' O.A.L. & 73,280 G.V.W.

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2½ YD. LINK-BELT CRANE-DRAGLINE. K-595. 140' BOOM & JIB. CAT. D17000 ENGINE
80 Ton GE Diesel Elec. Loco. New 1950.
44 Ton Gen. Elec. Diesel Elec. Loco.
25 Ton Gen. Elec. Diesel Elec. Loco.
40/50 Ton American Diesel Locomotive Crane. New 1944.
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90 HP Lidgerwood 2d Diesel Hoist.

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16", 18", 20", 22", 24", 28", 30", 36", 42", and 48" 5 or 6 ply. Belting is guaranteed free of holes or serious abrasions.

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Phone OL 4-6630

5 x 12 Hardinge COUNTER CURRENT CLASS.
Link Belt DEWATERING ROTOSCOPE 12' dia.
4—6 x 14 Simplicity VIBRATING FEEDERS.
ASPHALT PLANTS model 840, 842 & 848.
HYDRATED LIME PLANT 50 tons per day.
2', 3', 4' SYMONS. 3036 Dixie hammermill.
3018 roll. #6 McCully. 54B electric & Lima 802 SHOVELS.
Lima 44 & American 375 CRANES.
PLANTS: Pitmaster—Jr. Tandem—Pioneer 16V, 34V, 38V—880 Jr.—Primary 1036, 1824, 2036—3030 Impactor.
Jaw, Cone, Gyratory, Roll, Hammermill & Impact Crushers—Ball, Rod & Tube Mills—Screening, Washing & Crushing Plants—Classifiers—Compressors—Conveyors—Cranes—Drills—Dump Cars—Dredges—Engines & Motors—Feeders—Generators—Hoists—Kilns & Dryers—Locomotives — Pumps — Screens — Shovels & Draglines—Transformers—Euclid Trucks.

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6'-5"x100' & 6'x120' Kilns
Complete Lime Hydrating plant.

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1—48" x 60", 42" x 40", 30" x 36", 24" x 36", 18" x 36", 15" x 30", 12" x 24" Jaw Crushers.
2—42" x 16" Allis-Chalmers Crushing Rolls, rebuilt. 36" x 16 rebuilt Sturtevant rolls.
#636 & #848 Allis-Chalmers Hydrocone Crushers.
1—6", 10", 16", 20" McCully Superior Gyratory Crushers.
No. 3 up to No. 12 Gyratory Crushers.

BALL & TUBE MILLS

2—5½'x20', 5'x22', 6'x22', 7'x24' & 7'x35'

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8½'x65' & 8'x60

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2—3078', 2—2200' & 3—3800' Inger. Rand

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4—65 ton Whitcomb 2—25 ton & 1—70 Ton
2—45 ton & 1—80 ton & 4—100 ton Gen. Elec.

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36" x 20', 5' x 25', 6' x 72', 9' x 125', 5' x 35' Ruggles-Coles XA-8 Dbl. Shell.
33" x 18' Rotary Kiln W/Drive & Burner

REDUCTION MILLS & FEEDERS
4' x 8', 6'6" x 14'6" & 8'6" x 12' Rod Mills
5' x 10' Kennedy-Van Saun Rod Mill
2—No. 77 & 1—96 Marcy Ball Mills
4¼' Symons Std. Cone Crusher
30" x 42" & 24" x 36" Pioneer Jaw Crushers
30" x 36" & 36 x 42 Traylor Jaw Crushers
25B Telsmith Primary Breaker
20" x 36" & 24" x 36" Pioneer Jaw Crusher
14" & 28" New England Road Machinery
15x24 & 10x36 Cedar Rapids Jaw
3—200 HP & 160 HPSD. Ottumwa Elec. Hoists.

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POSITION WANTED: as temporary assignment by a graduate Engineer with 20 years experience in the production of cement, lime and other industrial minerals, Engineering and maintenance supervision, design and plant layout, equipment specification, combustion engineering, raw material examination and property mapping, research and product development, supervision of construction and plant operations, crushing and grinding, and classification studies for increased production. Will submit detailed qualifications and renummeration schedule on request. Box R-7, Rock Products, 79 W. Monroe, Chicago 3, Ill.

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POSITION WANTED Have had 30 years experience with Multi-plant company, 20 years as superintendent and general superintendent. Experience covers production, operation, maintenance and management of quarries, sand and gravel pits, ready mix concrete plants, and truck Fleets. Locate anywhere. Resume on request. Box R-15, Rock Products, 79 West Monroe Street, Chicago 3, Illinois.

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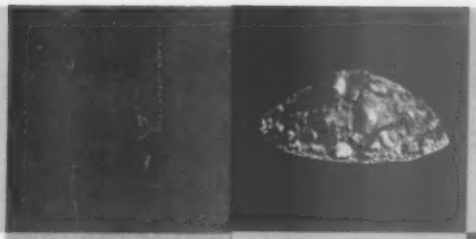

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